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IN THE great medical laboratories of the world, the name of Bausch & Lomb is held in respect. Technicians and research workers know that the Bausch & Lomb signature on a microscope or other scientific instrument is a guarantee of excellence of design and precision of manufacture—without which many of the great achievements of medical science would have been impossible.

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AMERICAN JOURNAL OF OPHTHALMOLOGY

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LECTURES ON CATARACT*

LIEUT.-COL. R. E. WRIGHT
Madras, India

The organization of routine in the Madras clinic has entailed my seeing and following up, day in, day out, for years, all the complications of cataract and glaucoma operations that occur. In round numbers, this has meant an opportunity of observing the mishaps in connection with over 20,000 cataract extractions and a tenth of this number of decompressions. I need hardly say that no attempt has been made here to analyze case records or figures for purposes of these discourses; the labor would have been impossible and it is extremely doubtful if figures of frequency, percentages of this and that, are of much greater value, when one discounts mathematical inaccuracies, than an opinion based on large experience. My colleague, Dr. Koman Nayar, who has shared my experiences, supports the bulk of the views arising therefrom. I gratefully acknowledge the freedom of access to his help and counsel.

Dogmatism in connection with the various procedures of the operative treatment of cataract is not uncommon, as any one may judge who follows up current literature, but the greater one's experience the more inclined one is to adopt an open mind. A man may indulge in dogmatism when he has collected figures in connection with 100 cases of the operative treatment of cataract, but he will probably be less inclined to do so after his thousandth extraction, and completely alter many of his previous views after his five thousandth case. Figures, if collected in such a way that the statistical method of analysis can be applied, may be invaluable as approximations to a true state of affairs. They may be very useful also from a suggestive point of view, but, even so, dogmatism is opposed to investigation, and its greatest value is in elementary teaching.

In cataract operating, every case is a law unto itself; one might say the same as regards operators. Those with very extensive experience share a certain intuitive appreciation of the difficulties that may arise, but perhaps have different methods of meeting them. My methods vary considerably, perhaps, from others' but I dare say others have very good reason for what they do, just as I think I have. The great aim is the best result with the least risk.

ROUTINE OPERATIVE TREATMENT

In routine cataract operating, when one is dealing with 30 or 40 cases a week, problems have to be faced, questions answered, and decisions made rapidly.

This being so, I want to give you an idea of how we attempt to sort our cataracts, excluding those which are not considered suitable for the ordinary standard procedures, surveying those retained for

* With this number of the Journal begins a presentation of the six lectures on cataract and glaucoma given for the Midwinter Course at Los Angeles, in January, 1936. They will appear in successive issues.

any obvious points in favor of the extracapsular or intracapsular method, or indications for special preliminary treatment or postoperative care; finally, how on the table, each case is considered as a law unto itself.

As a preliminary, those cases with intraocular complications, and cataracts definitely secondary to active generalized infections, those with congenital abnormalities, and unilateral cataracts, juvenile and congenital cataracts are excluded. Quiescent sequelae of external inflammatory origin, such as trachoma or corneal lesions, are not necessarily excluded from the routine operations. External diseases of the eye, such as inflammations of the lids and conjunctiva and infections of the lacrimal sac, are separated out, the former for suitable nonoperative treatment, the latter for extirpation.

Ordinarily, the eyes are not tested bacteriologically; provided the conjunctiva looks clean, they are regarded as suitable for a routine operation. The day before operation a trial bandage is applied, and if that is satisfactory they are cleansed by irrigation with 1/3000 perchloride-of-mercury lotion for two minutes on the morning of operation.

We prefer, if possible, to treat an ordinary, healthy-looking conjunctiva for a week with 10-percent argyrol drops and 2-percent yellow-oxide-of-mercury ointment. In such cases preoperative irrigation with normal saline for two minutes is adopted.

The ritual of general surgical aseptic technique as applied to eye operations is largely a pose and completely so when the immediate surroundings of the conjunctiva are unprotected and this area is considered sterile; for instance, the lid margins. Ritual may be largely dispensed with—and is, in our hospital practice—if the operator remembers that those portions of the instruments which enter the chamber or the wound and which presumably are sterile must not touch anything but conjunctiva; for instance, the knife point which impinges on skin must not be drawn back through the wound; the iris repositor which touches the lid margins must be discarded. The field must of course be protected from the respiratory tracts of the operator and others.

Generalized disease is carefully considered. Provided the eye itself is free, such conditions as leprosy, tuberculosis, syphilis, affections of the alimentary canal, and mental diseases are not necessarily contraindications, unless we consider that the general condition is in such a state that the undertaking of a cataract operation may precipitate a serious crisis, or that the general condition will so seriously prejudice the result of our operation that it is not advisable to undertake the operation at all, or possibly not until it has been treated adequately.

We now look at this group more particularly with a view to some of the difficulties that are likely to arise. At the same time we get a provisional idea as to whether any trouble may be anticipated, whether particularly conservative measures should be adopted, and whether an intracapsular or a capsulotomy procedure is *prima facie* more desirable; the final decision as to exact procedure being left till the patient is on the table.

Kidney Trouble. If albumen is present, the blood pressure high, and the projection poor we reject; otherwise we have a careful urological examination made and a notation of the case for special attention before proceeding with the operation. If the urine is albumen free but of low specific gravity, we do not necessarily send the patient for function tests.

A careful examination of the patient is indicated, but operation is not put off on account of sugar in the urine alone,

provided the patient has had a regular systematic routine of dieting, or insulin and dieting, established by his physician, or without such if the general condition is good. We adopt the policy of making no change in the diet or treatment, but a note is made that such cases shall be specially watched at the time of operation and in the postoperative period for hemorrhage and septic infections, either of the eye or elsewhere, and suitable measures taken.

A clinical search is made for active syphilis, but in the absence of any clinical finding or history, a routine Wassermann test is not made.

Pulmonary lesions are investigated inasmuch as they may give trouble on account of the coughing, or complications due to the recumbent position after operation. For cough we take special precautions, by putting the patients on mixtures which do not contain opium and note that complications should be avoided by getting the patients sitting up almost at once, after operation.

Asthma is recorded, and if the patient has any favorite drugs, a note is made of them, and the effect of adrenalin is inquired into or tried.

One or two intracapsular fractures of the femur and Colles's fractures occur yearly in our hospital practice and it must not be assumed that the idea of such a disaster with the better nursing of private practice is extravagant, especially in the earlier attempts at walking in the postoperative period.

Unless the mouth is very bad the patient is not sent for dental treatment. The majority of our patients' mouths are so bad that it would be impossible to take much notice of the condition. This does not appear to affect the result of the operation in any way; which is an interesting side light on the relative importance of oral sepsis, and the more modern ideas of bacterial allergy in this connection.

A special note is made of constipation and the probable effects of purgatives on the patient. The patient can often give information which is helpful in the postoperative period.

The blood pressure is observed and if high, saline purgatives before operation, or bleeding at the time of operation (150 to 200 c.c.) may be ordered; the adoption of bleeding and its amount depending on the weight, age, and type of the individual. In patients with high blood pressure and arteriosclerosis or hyperpiesia, we prefer to employ capsulotomy.

We meet with several cases of intracranial hemorrhage yearly, one or two of which are fatal and a small number of eyes are lost from posterior-segment hemorrhage. It is wise to warn the relatives of such possibilities, but not the patient.

Type of Patient. It may be possible to judge beforehand of the patient's excitability. In the general wards, the quiet and restful type of patient—and many of our poor Indian patients are such—does not necessarily get any sedative preparation till morphine is injected an hour before operation, cocaine drops instilled, a retrobulbar injection of novocaine given, and a facial block established by injection at the neck of the jaw.

Morphine, 0.25 gr., is always given fresh and combined with 0.01 gr. of atropine. Should there be the slightest sign of uneasiness during the preoperative preparation, 0.01 gr. of hyoscine is given in addition. We prefer to have special ward and more educated patients become accustomed to their future surroundings by keeping them at rest in the bed they are to occupy for a few days before operation. Sleep at night and restfulness by day is essential, and if the former is not sound and natural we give sedatives such

as luminal, 2 or 3 grains, night and morning. Other drugs may be used to this end—for instance, medinal, 5-10 grains, at night; or large doses of bromides, a mixture of the three salts, sodium, potassium, and ammonium, 30 to 60 grains for one or two days before operation.

In nervous private patients we may particularly wish to use morphia and should it not have been previously exhibited, it may be tried during the waiting period. Omnopon is less likely to excite vomiting and is preferable to morphia in other ways; in hospital practice morphia is cheaper and for this reason we use it. Certain patients are faddy about sedatives. If so, we humor them. The important thing is to insure an attitude of restfulness and confidence before operation, of practical indifference or actual narcosis at the time of operation, and sleep, quiet, and comfort for a couple of days after operation. If necessary, we give big doses of drugs. For example, we would not hesitate to give a divided dose of 3 grains of nembutal in the 12 hours (say 10 p.m. and 6 a.m., if operation is in the morning) before operation followed in the hour before operation by 1 c.c. of omnopon and 0.01 gr. of hyoscine in one dose or in divided doses with an interval, and in the 24 hours starting the same evening up to four tablets of allonal (10 grains) or 1 c.c. of omnopon in divided doses.

I have never found any harm resulting from allonal or nembutal when pushed; our patients appear to stand drugs well in spite of the fact that they are often old and feeble.

If the patient is excitable on coming to the table after routine small doses of sedatives, then something further must be done. Rather than delay whilst the effect of omnopon or/and hyoscine or/and nembutal is established, it may be convenient to give sodium evipan, in difficult circumstances. In very troublesome patients, although we may succeed in getting them quiet by preliminary sedatives and blocking at the time of operation, we must consider the postoperative period. For our own peace of mind we prefer to perform a capsulotomy on the excitable, restless, anxious types.

Factors other than those previously mentioned, likely to give trouble in the first week, are noted; for instance, enlarged prostate, piles, mental affections, cardiac failure, habitual sneezing, cystitis, uterine and vaginal discharges. In patients with conditions such as these we are apt to adopt more conservative methods.

Local Conditions. Certain local factors suggest that eyes shall be dealt with more conservatively and some cases are definitely earmarked for intracapsular extraction, others for capsulotomy. Let us consider some of these.

The Pupil. It is not always possible to test the pupil with a mydriatic beforehand, at all events to the extent of pushing it. If it is so examined and does not dilate well and round, the fact is noted; if it is not so tested we take it that a small, round, and mobile pupil may be suitable for either capsulotomy or intracapsular extraction. In either case the influence of pupil reaction on our decision is left till the patient comes on the table. We shall have more to say of the rigid pupil later. Irregularity due to old adhesions, only detected by mydriasis, suggests a capsulotomy with iridectomy, especially if the chamber is shallow.

The Nature of the Capsule. We know beforehand that morgagnian capsules are unsuitable for intracapsular operations with forceps; equally unsuitable are the majority of those with mother-of-pearl sectoring and swollen cortex. They may, however, be dealt with by the Barraquer

method, so that an intracapsular extraction is not excluded at this stage. Certain hypermature cataracts have very friable capsules and these are definitely discarded for the forceps intracapsular procedure.

Hypermature cataracts may have dense, thick plaques and these are unsuited for the erisiphake, but may be removed in the capsule with forceps, or dealt with by the extracapsular method.

The Myopic Eye. Myopia of over 5 D., if we know of it beforehand, is preferably dealt with by the extracapsular method. No doubt intracapsular extraction is successfully used even in high myopia; but it happens that the vitreous body in high myopia is seldom of normal consistence, and we are of the opinion that in abnormal states of the vitreous, whether due to physical causes, such as stretching of the globe, or to other causes that are present in advancing age, capsulotomy is safer.

The Bulging Eye. A bulging eye, such as one meets in fat, plethoric individuals, or exophthalmos from one cause or another, more especially if the chamber is shallow, suggests a capsulotomy with a large bridge flap or suture of the deep wound and possibly a complete iridectomy.

Shallow Chamber. In definitely shallow chambers, we prefer to adopt capsulotomy. Such may be associated with incipient glaucoma, but frequently we do not know this beforehand. In such eyes, should any definite evidence of glaucoma be present, e.g., a slight relative increase in tension, we prefer to do a capsulotomy with a broad iridectomy, unless indeed a prior decompression is for some reason considered better judgment, when an inferior-lateral-quadrant Lagrange is adopted.

The intumescent cataracts, said to be most favorable for expression, we exclude from intracapsular extraction with forceps, and rarely do we extract them with the erisiphake; with care the latter is suitable, provided the cornea shows definite evidence of a collapsing type of globe on completing the section.

Age and the Zonule. It is important to know the state of the zonule, but as a rule this cannot be determined beforehand. We prefer not to attempt intracapsular removal of immature cataracts in those under 50 years, unless their apparent age is more than this. We infer that unless the capsule is abnormally friable the zonule in a person of 50 years will give way before the capsule: to this extent apparent age enters into our decision. Immature cataracts in patients over 50 years or apparently over 50 are definitely selected for intracapsular extraction. In young persons they are needled; in the middle aged they may be removed by capsulotomy if of the posterior subcapsular type, or matured if of the central nuclear type.

One-eyed patients are dealt with by capsulotomy, since they have more to lose, are often more apprehensive and troublesome, and should be given the benefit of what we consider our most conservative procedure.

Intracapsular versus Extracapsular. We need not here go into a long discussion as to the relative merits of capsulotomy and intracapsular extraction. It is now generally recognized in clinics directed by men with very great experience that they both have a place. The fact that, having tried both extensively and by every possible method known, we still fall back on capsulotomy when things are not quite right, seems to show that we regard it as a safer procedure, and when employed with a broad bridge flap or suture of the deep wound and complete iridectomy, as our most conservative method. One may well ask why do intracapsular

work at all if the capsulotomy is regarded as safer. One reason is that it is very difficult to get a perfect capsulotomy with a clear pupillary area and such a fine capsular web as not to matter. If we merely achieve a good posterior segment with a dense after cataract, we are visually no better off. Other reasons why the intracapsular method is utilized are the immediate good vision that is obtained, the relative absence of postoperative irritation that is more liable to ensue if the extracapsular method is employed, and the relative simplicity and expedition of the technique. The capsulotomy method in the average case, not necessarily the selected case, is safer from serious complications on the table, in the immediate postoperative period, and in the last postoperative period.

The Vitreous. If we ask ourselves what are we really thinking of when we speak of the relative safety of these two methods, we must confess that it is the integrity of the vitreous body and the possible consequences of damaging it. We are not sure how the vitreous will behave should it form abnormal attachments. We are frightened of the vitreous; it is a tissue apart, and we feel that it will perhaps be a better-behaved vitreous if it is well contained behind the capsule-zonule diaphragm. A possible complication with the vitreous is really the most important consideration in making our decision whether we shall perform a capsulotomy or an intracapsular extraction. In my opinion, the respect due to the vitreous body is not yet generally acknowledged—we are still apt to make light of treating it badly. I am, of course, quite prepared to admit that it is better to have a fair vision for a time—sometimes for the duration of life—with a fluid vitreous and floaters, an impaction or iris inversion with opaque streamers, or an opaque condensation of vitreous face, than not to have vision at all.

If the vitreous is abnormal—and this we cannot ordinarily know beforehand, but if we suspect it from a history of floaters in high myopia, in hypermature cataract with degeneration, in very aged feeble patients, in retinitis pigmentosa, choroidal disease, or such—we consider it is wiser to perform an extracapsular operation.

Some interesting details were published not long ago in connection with the late results of cataract extraction in Meller's clinic. It was found that in parallel series of intracapsular and capsulotomy cases, equally good at time of discharge, when compared some years later the visual results in the capsulotomy cases were as good—in fact, better—than those in the intracapsular cases. This observation struck me very forcibly at the time. It is practically impossible for us in Madras to follow up our late results. It is very pleasant to see the perfect intracapsular cases go out with a nice round active pupil and good vision at the end of a fortnight or three weeks, but we must remember that this immediate result may be equalized later on by the good capsulotomy cases which are not quite so spectacular at the time of discharge, and of this we have considerable experience. Although we cannot follow up our cases for years so as to compare our best capsulotomy cases with our best intracapsulars, with regard to their late results, we have recently made an observation that is of some interest—I will not say importance—in this connection; namely, a comparison between an equal number of cases (apparently quite comparable in every respect), in which the actual operation itself was regarded in the theater as perfect, as to their behavior in the postoperative period spent under exactly

identical conditions. In this series we found that there were more postoperative complications amongst the intracapsular cases. This observation I would not lay much stress on, because there were only 50 cases in each group and figures are not reliable when applied to small groups of cases. A fact of importance is, however, that some complications in the immediate postoperative period are more serious in intracapsular cases than in capsulotomy cases. It may be remarked in passing that it took me longer to collect our 50 perfect capsulotomies than to complete the intracapsular series.

The foregoing remarks will give you to understand that we have not even now, after years of consideration and vast experience, come to the conclusion that even when conditions of operation are favorable, the intracapsular procedure is better than the extracapsular procedure when the latter is really well done; and our instinct is, as I have tried to show, that when in doubt, we still adopt capsulotomy. The safety of any procedure on the table depends largely on the skill and judgment of the individual operator, but mistakes—which are liable to be made by anybody—are hardly so severely punished in capsulotomy work. There is also more chance of putting capsulotomy sequelae right. Finally, I have always held, and still hold, that an eye with a zonule-capsule barrier intact, provided the vision is good, is *prima facie* a better eye than one in which it is not intact.

We still perform a large number of intracapsular operations despite the fact that the immediate postoperative complications when they occur give us more trouble than the best type of capsulotomy. The perfect capsulotomy is hard to achieve and the intracapsular, when it does go well, gives such a satisfactory immediate postoperative result and so little trouble with the prescribing of spectacles, that it is very tempting to employ it in hospital practice unless directly contraindicated.

I am not trying to lay down rules of procedure for others. I have learned not to be rigid myself; you must all cater for your own conditions, your patient's good, and your own peace of mind. But do not be overwhelmed by the apparent importance of the decision, capsulotomy versus intracapsular. This is not the point. One would think from the controversies that go on in the journals that it was the point. The actual point is, how can you give the patient the best visual result suited to his needs and the particular circumstances of his case, and what method will you adopt so that the patient may not be subjected to undesirable risks?

Let us now assume that our patients are posted for operation. Some have been earmarked for capsulotomy, some for intracapsular, some for special attention on account of their general condition. No matter which method is adopted, we regard it as essential that a quiet attitude on the part of the patient be assured by suitable rest and sedatives.

We prefer to operate in the morning. If the bowels have not opened freely, we give an enema. Dilatation of the pupil by atropine is started in good time before operation, for we have found that with four instillations of 1-percent atropine at intervals of five minutes it takes about two hours to obtain maximum mydriasis and even then, in our heavily pigmented eyes, the pupil in the average case is poorly dilated.

Subsequent to cleansing the skin, cutting the lashes, and the conjunctival irrigation, four instillations of 4-percent cocaine are given at intervals of five minutes. Then a retrobulbar injection of novocaine and adrenalin is followed by a

motor block over the neck of the lower jaw, and finally two or three instillations of adrenalin when the patient is actually on the table. I need hardly say that we regard good anesthesia and akinesia as exceedingly important.

Importance of Sedatives, Narcosis, Anesthesia, and Akinesia. I do not think it is an exaggeration to say that the improvement in our methods under these heads in the past fifteen years has altered the whole picture of cataract extraction. In 1921 I ventured to write that a simple method of paralyzing the circumorbital musculature would revolutionize cataract extraction in India. We have such a method today, but have advanced still further so that the modern surgeon is enabled to operate under conditions of a narcotic order, without the distractions, either on the table or in the postoperative period, associated with the nearest approach to these conditions obtainable with the local-instillation or general-inhalation methods of earlier days.

Operative Procedure. The final decision as to what procedure we shall follow is left open in nearly all cases till the time of operation, for there are often factors only determined then, for instance those associated with: 1. The behavior of the pupil under mydriasis. 2. The anesthesia and akinesia. 3. The behavior of the patient in the theater. 4. The effect of drugs or other influences on the well-being of the patient. 5. The state of affairs after section is made, more particularly the behavior of the posterior-segment contents. 6. The tendency to hemorrhage. 7. The nature of the capsule.

Routine Types of Operation. (1) The intracapsular—in apparently straightforward cases.

We adopt the forceps method in the majority of cases, less often phakoërisis, and very rarely expression. Perhaps from 30 to 40 percent of our extractions are intracapsular at present. A few years ago we expected to do up to 60 percent as time went on; but actually the rate dropped, owing possibly to our trying out variations of capsulotomy.

For general use the forceps method is perhaps safest and simplest. There is, however, an objection to the argument that the occasional operator will find the forceps method equivalent to a well-planned capsulotomy—even if he tears the capsule. To anyone who thinks, the fallacy is obvious. It is not equivalent, and the occasional operator may find himself in the nasty position of having both a torn zonule and a torn capsule if he sets out with the idea that they are equivalent.

We use a large section, a full diameter, and a moderate-sized conjunctival flap without a suture. In dealing with the large nuclei of total sclerosis, the relatively large nuclei with soft friable capsules, smooth capsules, and immature cataracts, when we get the impression from the appearance of the patient or the age that the zonule is relatively strong, we employ the erisiphake. When the capsule folds readily and the cortex is glutinous and we feel reasonably sure that the zonule is weak, conditions are optimum for the forceps.

Different varieties of forceps are used: The Kalt, the Elschnig pattern, and a forceps made for me by Weiss. An essential thing about such forceps is that the jaws should meet parallel, not first at the toe and then near the heel as pressure is applied. All these forceps have their good points; none is quite satisfactory. We try, as a rule, to tear the zonule below, and without releasing follow up with an instrument in the other hand. I often use a Kalt forceps for this; it serves the double purpose of lifting the flap first and applying counter-pressure below as the lens tumbles.

I need hardly say that if the section gapes or there is an obvious thrust of the posterior segment forward, as judged by the behavior of the corneal flap, we perform a capsulotomy, relieving the tension at once in the former case.

We prefer to tumble, having started the lens below, but if the lens presents more easily elsewhere we humor it and apply suitable aid with the other hand to effect a nasal, temporal, or superior-pole direct delivery.

The pupil should be of ample dimensions; the contracted pupil should, as a rule, be enlarged.

In retracted sockets, with negative pressure in the posterior segment we hope to see the iris fall back into the patellar fossa. In full orbits, the vitreous becomes globular, bulges forward, and the chamber remains empty. In the former, we always fill up with the irrigator and make a marginal buttonhole or concentric slit, as we think desirable. In the latter, the irrigator is not used; but if the pupil is somewhat eccentric reposition is effected, preferably by massage of the cornea or with an iris repositor. If hemorrhage spoils our view of the capsule in applying the erisiphake or forceps, it is gently washed out. Clot in the chamber after extraction is removed with forceps, if it can be done with safety. Blood clot or fibrin in the chamber may give rise to deposits on the vitreous face, or synechiae.

Expression is now only adopted as a primary operation in certain morgagnian cataracts with irregular thickening of the capsule, but the follow-up in all forceps cases is of the expression type, except that direct pressure is not made on the vitreous body. Expression definitely puts more pressure on the vitreous than the other methods and is more productive of vitreous trauma.

For the small peripheral aperture in the iris, a forceps of the Hess elbowed type is used, either the original type, our own modification, or similar patterns. We prefer a fine single-tooth type with a fairly long handle. I consider it is most important to retain a round pupil and establish miosis, although some operators of great experience prefer to adopt a complete iridectomy rather than incur the extra difficulty of delivery through a moderately dilated pupil. I sometimes divide the sphincter below with a de Wecker scissors, if it does not dilate, rather than leave the vitreous face uncovered above and more free to develop anterior adhesions in the neighborhood of the section in the postoperative period.

Why do we not adhere to phakoërisis? Chiefly because:

1. We advise postgraduates and the occasional operator that the forceps method is more suited to their conditions. 2. The erisiphake is not simple; it requires constant care and is expensive. 3. It has greater dangers for the inexperienced and when mistakes are made with it they are often more serious than with the forceps. For average intracapsular work phakoërisis is preferable to me, but this is hardly the point; it is not better for the bulk of operators.

Let us recapitulate some of the features that influence us in a decision against intracapsular extraction:

General. Cough; asthma; high blood pressure; the very excitable restless patient; cardiac disease associated with breathlessness and the possibility of embarrassment, for instance, a result of flatulence; conditions likely to give rise to postoperative straining, for instance, enlarged prostate, piles.

Local. Rigid pupils, unless they dilate moderately—say, over two thirds—and are free from synechiae or are enlarged. Myopic eyes with degeneration of vitreous. Degeneration of vitreous from any

cause. Bulging eyes with shallow chambers. Glaucoma and preglaucomatous states. Immature cataracts when the age or apparent age gives the impression that the rupture of the zonule will either not take place before that of the capsule or will inflict too great trauma on the ciliary body. Smooth capsules, for instance, in morgagnian and premorgagnian states; intumescent cataracts with sectored cortex, or others (this applies only to forceps extractions). One-eyed patients.

Routine Capsulotomy — Variations. Having decided on a capsulotomy extraction, the next question is how to operate so as to obtain as complete a removal as possible of the lens matter and anterior capsule. What we would desire to leave behind is the zonule, an equatorial margin of anterior capsule, and the clear posterior capsule with a round pupil. I need hardly say this is not often achieved. With a view to removing as much anterior capsule and at the same time leaving as few tags behind as possible, I have tried almost every known device. Originally I followed my predecessors and performed a preliminary capsulotomy with the needle. In some ways it was an excellent procedure, for it gave quite a lot of information in many cases and enabled one sometimes to detect difficulties before the section was actually made, especially in hypermature cataracts. Its chief drawback was that it did not achieve anything better than an irregular tear, since the capsule does not lend itself to clean cutting in the ordinary way. The objection to the procedure, that the chamber might be emptied and the section made more difficult, is not worth considering. Even if one did by some chance lose aqueous, all one had to do was apply the irrigator nozzle to the needle hole and fill the chamber again.

I will not go into long details of the evolution of methods in this connection. Latterly, I have come to regard a capsule flap made with the knife at the same time that we make the section as, perhaps, the best method, when it can be performed without leading the operator into difficulties, and capsulotomy with a good type of forceps as the next best. The capsulotomy with the knife is no doubt a very old procedure, but not as we perform it. In suitable cases we raise a large flap, which after the cortex is washed away may be torn off at the hinge, leaving a great central aperture behind which lies the posterior capsule only. In carrying out this procedure it is almost essential to have good illumination, magnifying operating glasses, and a forceps suitable to grasp the capsule. Messrs. Down Brothers have made such a forceps for me.

With regard to cortex, we probably have a great deal more trouble than people in the West, because in many of our cataracts it is crusted and shrunken, or sectored and fibrillar, rather than of a soft pultaceous type, varying in depth with the degree of sclerosis of the nucleus, such as is probably more common with you. We therefore pin our faith to the irrigator, and the use of the irrigator is to us a *sine qua non* in extracapsular extraction. With the irrigator, provided we select our cases properly, the contents of the capsule can be brought away clean. Under special circumstances we may have to depart from this procedure, but at present we regard it as the best capsulotomy method to employ. The irrigator nozzle is of a special type suited to stroking the cornea from limbus to center, thus dislodging equatorial particles; this maneuver being alternated with directing the stream into the anterior chamber by resting the curved beak on the posterior lip of the wound.

The Section. We have tried every type of section, corneoscleral, corneal, narrow

marginal flaps, small tongue flaps, large flaps, but are inclined at the present time to give pride of place to the bridge flap. Theoretically, a corneoscleral section, or a narrow marginal flap, with suture of the deep wound is a more correct surgical procedure. In hospital practice there are difficulties, but I still feel that the ideal extraction should aim at surgical closure of the deep wound by simple and effective means. We make exceptions, of course, but ordinarily the various varieties of the bridge flap are considered applicable to most cases. When we anticipate postoperative difficulty, we often make such a flap very wide and leave a distinct margin or fringe at the level of the puncture and counterpuncture. This we regard as a very conservative procedure. If we have no reason to fear the patient, we are not so inclined to use a broad flap. For greater convenience, a flap may be made to one or other side; for example, a narrow bridge to the temporal side. There are two objections to a broad flap: one is hemorrhage, the second is difficulty of making a buttonhole iridectomy. The latter can be avoided by a short vertical linear cut in the flap itself near the limbus through which the peripheral iridectomy is made. In cases of flabby iris where prolapse threatens, we may make a buttonhole on either side of the flap. Hemorrhage is our chief objection to the bridge flap, since a substantial bridge may be attended by troublesome hemorrhage. We shall say more about this when dealing with difficulties at the time of operation.

If a bridge flap is going to be a useful proposition in a very troublesome patient who is expected to cause anxiety from squeezing or interfering with the eye in the convalescent period, it must be wide; a narrow, elegant, ribbon bridge is not really of much use as a security device. If hemorrhage is to be avoided absolutely, the section should be kept limbal until it is desired to finish off the section with a narrow bridge.

The bridge, of course, is not equivalent to a stitch in an ordinary surgical wound, neither is a conjunctival suture in an ordinary flap. In either case the conjunctiva is merely held in place. The deep wound may remain open and often does. Free movement is possible if the necessary disturbing factors occur; still the adhesion of the tongue flap, more especially if augmented with marginal flaps, maintains good apposition. Sutures that hold the lips of the deep wound together probably offer the greatest safety, but we have not yet satisfied ourselves as to the best method of achieving this.

The nucleus is delivered in the ordinary way under the bridge by dipping the posterior lip of the wound with a repositor while gentle counterpressure is made at the limbus below, so as to cause a presentation of the upper pole through the capsule and pupil, following up from below with the right and delivering laterally with the instrument in the left hand. The irrigator is now used until we consider all cortex has gone.

During this process, if the operator wears an effective operating glass, the capsule flap will be seen floating in the irrigator stream, when illumination is suitable.

Operating Spectacles. I should like to stress the importance of wearing suitable operating spectacles. There are numbers of details which one may miss if glasses are not worn. For example, it is difficult to see the capsule flap and remove it. It is still more difficult to see such a thing as a marginal stripping of Descemet's membrane. A special forceps is now passed in and the flap seized and torn off at its base. Usually a small peripheral iridectomy is performed after delivery; we seldom perform a simple or narrow com-

plete iridectomy unless the pupil is small and rigid before delivery, or a flabby iris persists in presenting in the wound, when an iridectomy may be done in that region after delivery.

A broad iridectomy is done only under special conditions, such as in eyes in which we have reason to anticipate subsequent tension, a threat of wide iris incarceration, or in complicated cases of various sorts; these we are not now considering.

Routine capsulotomy with a flap may well be adopted in cataracts in which the cortex is swollen and sectored, but liquefying; in completely liquefied morgagnian cataracts; in cataracts with soft pultaceous cortex; and in cataracts with a ring of shrunken cortex at the equator. In the latter the dislodgment of the lens matter sometimes requires a little encouragement; the irrigator nozzle is used as an instrument of massage applied just beyond the limbus all around.

There are certain cases, however, in which the capsule-flap technique cannot be adhered to; for example, those with a small rigid pupil, or a densely thickened capsular plaque, or in some cataracts of the total sclerosis type, such as the brown or black cataracts with no soft cortical matter but with the hard lens substance right up to the anterior capsule.

It is difficult and sometimes dangerous to try to cut a capsule flap when there is scanty soft cortex, although an effective capsulotomy may sometimes be made in such cases by a toothless cutting forceps and the large nucleus delivered with the aid of a needle, should an extracapsular rather than an intracapsular be adopted.

When difficulty occurs in causing the nucleus to present through the pupil; or should it be known that the zonule is exceptionally friable, dehiscent, or torn, especially if the nucleus is large, as in total sclerosis; or should the cataract be immature but of the posterior subcapsular type, instead of delivering in the usual way the nucleus is wheeled out with a needle.

Capsulotomy with capsule forceps may be adopted if the pupil is so small that it cannot be done with a knife; either the pupil is enlarged or a special forceps introduced through the semidilated pupil. The instrument (Down Brothers) has its jaws curved to correspond with the curvature of the lens, and the toe and heel are without teeth. The heel projects slightly backwards from the junction of shaft and foot. Again, it may be adopted if the section has been made with the idea of an intracapsular extraction, but this has had to be abandoned; for instance, on account of smooth capsule, excessive movement forward of the lens. We need not go into further detail here, as it is only desired to give an outline of the routine. This type of capsulotomy aims like the other at a large central gap.

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CHOROIDAL TEARS

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The view is expressed that in some small so-called ruptures of the choroid only the pigmented epithelium may be torn. An anatomical confirmation is given. From the Eye Hospital, University of Amsterdam.

Tears of the choroid after contusion range from severe, generally multiple, ruptures to slight tears without any hemorrhage.

Figure 1 shows typical ruptures of the choroid in an eye which had been hit by a tennis ball three weeks previously. There were hemorrhages at the site of the ruptures and in the vitreous. However, the retina over the tears remained unimpaired and five weeks later vision was completely restored.

According to Wagenmann,[1] the anatomical basis of this lesion is a tear of the inner layer of the choroid, Bruch's membrane, and the pigmented epithelium. A cicatrix appears consisting chiefly of mesodermal tissue (fig. 2).

Hirsch's[2] theory that some of these ruptures do not affect the choroid but only the pigmented epithelium and Bruch's membrane—as in myopia—was rejected by Wagenmann, whose view was confirmed by the histological studies of Wolfrum.[3] This writer showed that the posterior elastic layer of Bruch's membrane is inseparably connected with the normal choriocapillaris, so that the latter is inevitably involved if the former is torn.

In 1930 I saw a girl of 17 years, who complained of blurred vision of the right eye. A few days before the eye had been struck by a cardboard disc such as is used under a beer glass. Vision was normal, although, perhaps, a little less than that of the left eye. In mydriasis a slightly curved streak became visible at the temporal side of the macula (fig. 3), unaccompanied by any edema or hemorrhage, a typical "rupture of the choroid." In studying this rupture by direct ophthalmoscopy the diagnosis rupture of the pigmented epithelium seemed more adequate. This hypothetical diagnosis, however, lacked an anatomical basis.

Recently, in studying an eye enucleated for traumatic glaucoma, a similar lesion was found anatomically (fig. 4) which demonstrated the possibility of an isolated rupture of the pigmented epithelium.

I summoned the patient for reëxamination and found no marked change, which was confirmed by comparing the fundus photographs. In direct ophthalmoscopy, the edges of the rupture were not clear cut, but slightly granular; however, there was no other sign of overactivity of the pigmented epithelium. The fovea was normal as well as the visual acuity. The color of this streak was not so red as one might expect directly facing Bruch's membrane and the underlying choroid. It had a lighter but slightly yellowish tinge as compared with the normal fundus.

The eye in which the rupture of the pigmented epithelium was found was described by Tillema.[4] The rupture was situated near the ora serrata and measured 1.5 mm. by 3 mm. Bruch's membrane appeared to be normal, at least as to its posterior elastic layer. Whether the anterior layer of Bruch's membrane related to the pigmented epithelium was ruptured seemed not im-

Fig. 1 (Hagedoorn). Typical rupture of the choroid, traumatic, left eye.

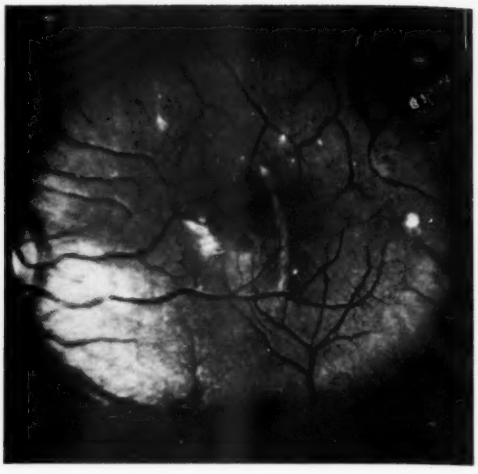

Fig. 3 (Hagedoorn). Fundus showing typical "rupture of the choroid" at temporal side of macula, right eye.

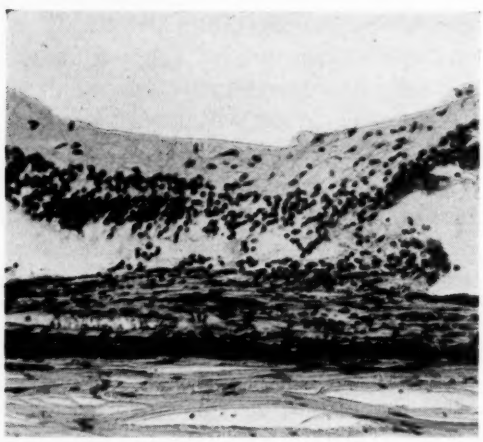

Fig. 2 (Hagedoorn). Showing cicatricial tissue of the choroid extending inward between ends of retinal pigmented epithelium. Retina is adherent to cicatrix in choroid.

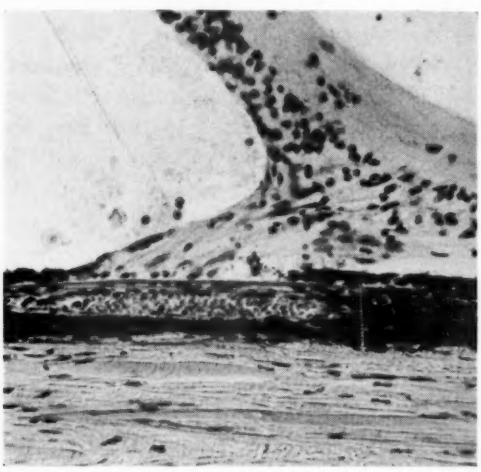

Fig. 4 (Hagedoorn). Showing rupture of retinal pigmented epithelium and adherence of retina to Bruch's membrane.

probable but was difficult to demonstrate as the sections were rather thick (20 μ) and stained with v. Gieson's stain and hematoxylin eosine. Although the elastic posterior layer of Bruch's membrane was completely preserved and very distinct, there was a slight lymphocytary infiltration in the underlying choroid. The pigmented epithelium was partly normal, partly slightly irregular in the neighborhood of the rupture. It did not show a marked proliferation at the site of the rupture, although isolated pigmented cells were found in the fibrillary tissue which connected the altered retina with Bruch's membrane. While the scar tissue in the rupture of the choroid (fig. 2) was chiefly mesodermal, here (fig. 4) it was purely ectodermal (glial). Here and

there the pigmented epithelium at the edge of the rupture bends off, covering this tissue over a short distance. The retina remains fixed to Bruch's membrane at the site of the rupture by this glial tissue, which is stretched as a result of the artificial detachment of the retina.

Thus the possibility is demonstrated that the slight ruptures, as they are seen especially in the neighborhood of the macula, are ruptures of the pigmented epithelium rather than ruptures of the choroid. Besides this rupture, the pigmented epithelium is slightly damaged at other places. Perhaps this may lead to ophthalmoscopic changes to which little attention has been paid in recent years.

Becker[5] (1878) described pigmentation of the retina after trauma. Probably drusenlike anomalies may be attributed to a trauma, since these are found anatomically in eyes enucleated some time after a trauma.

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IMPORTANCE OF ANISEIKONIA

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Aniseikonia, disparity of size in retinal images, was known and discussed in 1875. Duane advocated full correction for high anisometropia. Aniseikonia is not troublesome in congenital nor in developmental cases, but in adults when refraction is corrected and there is disturbance of the sensorimotor coördination that effects binocular vision. The problems of aniseikonia are to be solved by the flexibility of nerve development. When glasses are prescribed patients should be encouraged to persist in wearing them despite possible discomfort until physiologic adaptation has been effected. Read before the Section on Ophthalmology of the American Medical Association at Kansas City, Missouri, in May, 1936.

Aniseikonia means unequal images, being derived from the Greek words, "anisos," unequal, and "eikon," an image. Anisocoria—unequal pupils—and anisometropia—unequal refraction of the two eyes—are words of similar origin and general significance. Aniseikonia has been used by Professor Ames,[1] of Dartmouth College, and his colleagues, who have become interested in the inequalities of dimensions of the images formed on the retinas of the two eyes. Such inequalities and distortions were first discussed before the American Ophthalmological Society in 1875 by Dr. O. F. Wadsworth,[2] of Boston.

These inequalities and distortions are physical facts that may be studied with interest by physical and mathematical methods. They remind us of the horopter, a mathematical conception that, almost a century ago, claimed the attention of Mueller and Helmholtz, but which has since proved of little practical importance. Professor Ames has devised elaborate instruments for the recognition and measurement of differences of size between the retinal images of the two eyes. Mathematic formulas have been worked out for grinding lenses to equalize such images. This is a worthy subject of scientific interest and investigation. But for physicians and their patients, the practical interest of aniseikonia lies in other directions.

Aniseikonia does not cause noticeable impairment of vision. It is felt through disturbance of the sensorimotor coördinations that belong to binocular vision, changing the appearance of what is seen. Interpretations of visual impressions do not depend on inherited limits of anatomic structure; but arise from the visual experience of an individual, by the use of his eyes. The disturbances caused by such inequalities are felt, mostly, when the coördinations are changed by the wearing of correcting glasses; and they are to be corrected by use of the eyes under the changed conditions—getting accustomed to the glasses. Every change of glasses entails some change in the retinal images. But these effects are only noticed when sufficiently great to rise above the thresholds of consciousness. They are important only when they disturb the function of binocular fusion. The anatomy of the eye, its size and physical proportions, may depend wholly on inheritance and congenital development. But its physiology—the perfection of its function and usefulness—is developed by individual experience. Binocular vision is more a matter of individual experience than of inherited anatomic structure.

The sizes and inequality of retinal images depend on the distances of the retinas from the posterior nodal points

of the eyes. This can be demonstrated by holding lenses before one eye. Any convex lens advances the nodal point, brings it farther in front of the retina and enlarges the retinal image. Any concave lens before the eye brings the nodal point nearer to the retina and makes the image smaller. The farther the lens is held from the eye the more it changes the apparent size of the image. This may be tried with one- or two-diopter lenses while looking at distant objects; or with three- to six-diopter lenses, for looking at near objects. Try this and notice the effect on the apparent size of the objects seen through the lenses when these are moved closer or farther away from the eye. With lenses thus placed before one eye, but with both eyes open and looking at the object, the image on one retina can be increased or diminished, while on the other retina the image remains unchanged. One may thus test his own power to fuse images of different sizes, and judge to what degree aniseikonia is able to disturb his own vision.

It is a striking fact that, generally, no noticeable disturbance of vision has been complained of by persons in whom the aniseikonia is congenital, or has arisen during the normal development of the eyes. But the disturbance produced by glasses used in this way is noticeable with less disparity between the images. The disturbance it causes is proportioned to the suddenness with which it is produced. It is felt as a disturbance of the coördinations that effects binocular vision. These coördinations are not inherited reflexes, but are established by individual experience in the use of the two eyes. They vary widely in different persons who have quite similar eyes; but they remain largely plastic, subject to further development by use of the eyes throughout the greater part of life. It is this capacity for new development that makes it possible to get binocular vision when the optical adjustment of the eye is changed by the wearing of glasses.

In 1875 Dr. O. F. Wadsworth, of Boston, called the attention of the American Ophthalmological Society to the distortion of images caused by holding a concave cylinder before one eye with its axis vertical. He explained the disturbance of binocular vision thus produced and supported his explanation with diagrams to be viewed through the stereoscope. In 1883 Wadsworth also called attention to the distortion of objects by prisms; and pointed out that the refraction of a prism, causing the rays to diverge from a point different from that of their real origin, caused a flat surface to appear curved; convex when the bases of the prisms are turned toward the nose, and concave when the bases are turned in the opposite directions.

In 1888 Dr. J. A. Lippincott, of Pittsburgh, published an article[3] upon "Binocular metamorphopsia" produced by correcting lenses, in which he explained the apparent distortion so produced by changes in the retinal images. He pointed out that such apparent distortions disappear with continued use of the glasses, and the reëducation of the power of judging size, shape, and distances. He pointed out that such metamorphopsia occurred in nearly all cases of anisometropia, and in eyes free from astigmatism. In a paper read before the American Ophthalmological Society in 1890, he proposed such binocular metamorphopsia as a test for malingering, proving binocular vision in cases claiming blindness of one eye.

In 1889, Dr. John Green, of St. Louis, published a paper[4] on "Stereoscopical

illusions evoked by prismatic and cylindric spectacle glasses." His attention had been called to them by a geometrician for whom he had prescribed spectacles. The patient suspected an error in his glasses; but after the phenomenon had been explained to him, he wore the glasses with entire satisfaction. Green illustrated some of these illusions with diagrams to be used stereoscopically and pointed out the natural interpretation placed upon the differences of size and form when viewing them with binocular vision. These diagrams will be found helpful by any one attempting to understand aniseikonia.

In 1899, a symposium before the Section on Ophthalmology of the American Medical Association included five papers relating to allied subjects and their discussions by 14 members of the Section. These were published in the Journal of the American Medical Association and in the Transactions of the Section[5] (61 pages). Among those who took part in the discussion were 10 speakers who had before, or who subsequently, served as Chairmen of the Section. These papers and discussions dealt with high ametropia, high anisometropia, very high astigmatism, astigmatism following cataract extraction, and with oblique axes; and the correction of these conditions with strong lenses. The one remedy for the distortions caused by such lenses, relied on by all participating in the discussion, was the constant wearing of full correcting glasses, and no doubt of the efficiency of this remedy was expressed. It was pointed out that even doubling the size of one retinal image as compared with the other, by lenses placed before an eye, did not necessarily prevent the binocular fusion of the images.

In 1901 Dr. Alexander Duane,[6] who did not take part in the above symposium, published his experience with high anisometropia and its full correction by spherical and cylindrical lenses. He tabulated 39 cases in which the differences between the refraction of the two eyes ranged from 2D. to 10D., which he had treated by a full correction of both eyes. The results were satisfactory, while the patients were under observation, in 28 of the cases immediately, and in 8 others ultimately. He found "in many instances temporary discomfort is produced by the glasses; but in the majority of such cases the discomfort soon disappears, if the glasses are steadily worn." "The statement that glasses correcting anisometropia cause trouble, by producing retinal images of different sizes, is probably fallacious; trouble not being caused in this way." He quotes the case, reported by Reagen,[7] in which after cataract extraction, +10.D. before one eye and —10.D. before the other were worn with comfort.

Duane says: "In my experience, if the glasses are worn persistently the troubles they occasion soon abate." In his experience the causes of discomfort were: the strength of the glasses prescribed; the unequal prismatic actions of the unequally strong glasses; and muscular anomalies producing diplopia.

The plan that gave satisfactory results for Duane and others who have used full correcting glasses constantly worn has been tried by many who have given close attention to correcting ametropia, and it has been so satisfactory in practical results that mathematical niceties, theoretic or actual, like identical points of the retina, inequality of retinal images, and the horopter, have been almost forgotten.

The term aniseikonia, the laboratory apparatus required to make measurements of it, and the manufacture of

glasses equalizing the size of the images in the two eyes give emphasis and significance to the often-experienced known difficulty of getting accustomed to new glasses. But it does not invalidate the conclusion of Duane, or general experience, that constant wearing of the glasses will overcome that difficulty. The most surprising supposition brought out, in connection with this rediscovery and renaming of aniseikonia, has been the idea that anatomical anomalies of "brain centers" can cause the symptoms of nerve strain through use of the eyes and require the correction of aniseikonia to give relief.

The work of physicists and mathematicians has now established the existence, the physical basis, and the frequency of aniseikonia. It is now time for the physiologists and clinicians to recognize and deal with it. Life is adaptation of internal processes to external conditions. The environment of civilization has presented many conditions to be met by human development, and some of the most important of these are the conditions and requirements as to vision.

The greatest provision for bodily adaptation is the plasticity of the cerebrospinal nervous system. The human brain shows great changes from the brains of other classes of mammals, and its power of adaptation extends to the capacity for educational adaptation of the individual. A most striking example of adaptability is the power of perfecting binocular vision by spontaneous individual experiment or by systematic orthoptic training.

The problems of aniseikonia, although based on physics and capable of mathematic statement, are to be solved by the flexibility of nerve development. The total number of nerve cells may be strictly limited. But the capacity of the nerve cell to replace its injured branches and develop new associations is very great. Upon this ability depends the individual skill of the musician, the record of the baseball pitcher—eminence in any art or any sport. Upon this ability to develop new associations in the brain depends the ability to overcome the difficulties raised by aniseikonia. Let us remember that, from the standpoint of evolution, binocular vision is a recent requirement. The development of the eye starts with the formation of the optic vesicle—the retinal branch of the central nervous system. But the thickening of the retina at the macula does not begin until the fifth month of fetal life and is incomplete until several months after birth. The eyes are not directed forward until birth; and it is after that, that the infant begins attempts to learn binocular vision. Binocular movements and fusion are capable of modification by appropriate exercises well on in adult life; and recovery from paralytic squint shows some power for reëducation, even into old age.

No anatomist has traced a path of nerve conduction from a single cone of the retina to a particular nerve cell in one of the cerebral convolutions; and probably no one ever will. In the nerve cells of the retina, in those of the basal ganglion, or at every relay station up to the highest of the brain centers the branching dendrites of each nerve cell offer many paths for the nerve impulses that have started in the percipient elements of the retina. In the so-called motor centers of the brain electrical stimulation at different points can give rise to precisely the same movements.

John Hughlings Jackson, the neurologist, whose studies in the London Hospitals first drew attention to what has been called "Jacksonian epilepsy," taught that all brain centers should be

regarded as sensorimotor centers, and emphasized that it was better to speak rather of three different "levels" of brain association, the lowest giving rise to most limited movements, the highest to the most generalized convulsions. Charles S. Sherrington says, "no single point in the cortex evokes the act of ocular convergence and fixation. . . . The execution of natural movements employs simultaneous coöperative activity of a number of points in the motor fields on both sides of the brain together." Sherrington has called his great book "The integrative action of the nervous system." He points out that "the conducting paths of the nervous system, traced from beginning to end, never *terminate* in the centers of that system, but pass through them." The nervous system associates all the elements, all the powers, all the actions of the living body. It is not an army, with generals telegraphing orders to subordinates. Every nerve cell is transmitting nerve impulses. Every part of the cell is doing it. These impulses may be reinforced, moderated, changed in some way at every point of their passage. Axons, dendrites, perikaryon, cell body, or nucleus shares in the transmission. Each impulse comes to represent the integrated experience and purpose of the whole. The single nerve cell, performing a single function, is something unknown to science. It is only a possible theoretic hypothesis. More than 70 years ago, discussing the theories about identical or corresponding points on the retina, Helmholtz[8] wrote: "Any hypothesis which assumes that the fibers proceeding from corresponding places on the two retinas are united in a single fiber that transmits the impressions in the two eyes unseparated to the brain, is inadmissible and incompatible with the facts."

The theoretic doctrine of an intuitive space sense was shown to be an unnecessary and mistaken assumption. The facts that have been brought out since Helmholtz showed this have supported and established his conclusions.

At the present time our eyes are used, largely, to watch moving objects or stationary objects when we are rapidly moving. A bird flies in front of our eyes, in a fraction of a second doubles the size and totally changes the form and appearance of our retinal images. We read a book and, with each line, vary the relative sizes of the letters for our two eyes over 4 percent, for a line four inches long, held 10 inches in front of the eyes. When accustomed to it such use of our eyes causes no confusion, nor noticeable nerve strain. That aniseikonia as a cause of nervous symptoms is to be classed with errors of refraction and strain of accommodation is an assumption opposed to known facts. To assume that there are corresponding nerve cells in the two cerebral hemispheres that must receive similar impressions is not supported by anything we know about brain functions.

The really important facts brought out by recent investigations of aniseikonia are these:

Correcting glasses placed before the eyes change the sizes and forms of retinal images. Such changes require changes in cerebral associations of the visual process. Such a process of physiologic adaptation is necessary with each important change in correcting glasses. Our patients should be warned that such disturbances of vision may result; that time should be allowed to effect the change of cerebral associations before they expect full service from the new association of eyes and glasses; that "getting used to glasses" is a real and necessary process, important enough to justify

giving it the necessary time and attention; and that the prescribing and selling of glasses is only of service to the patient when the physiologic adaptation to them has been secured.

Republic Building.

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A NEW VISUAL-ACUITY AND ASTIGMATISM TEST CHART

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In this paper the following points a.e briefly discussed: (1) The requirements of a good test chart in general. (2) The essential features of a satisfactory test object. (3) Disadvantages in the use of test objects of the capital-letter type. (4) Merits of the double-broken circle as a test object for testing acuity and astigmatism. (5) Inaccuracies in the construction of the test objects used in current charts and the limits of accuracy within which the objects described in the present chart have been constructed. (6) Deficiencies in the number of sizes used for the test objects in current charts and in their distribution in the scale of sizes; the failure to make adequate provision for eyes of poor and better-than-medium sight and for the variation in acuity with age and intensity of illumination; and the remedies for these deficiencies and failures in the construction of the present chart. From the Research Laboratory of Physiological Optics.

In very general outline an acuity chart should have the following features: (1) It should be made up of test objects which meet the essential requirements of testing the power to discriminate detail and of detecting and analyzing defects in the image formed on the retina; (2) the test objects should be accurately constructed in accordance with a predetermined scale; and (3) with reference to number and distribution as to size, the test objects provided should cover as broadly as possible the needs and convenience of the examiner. The first of these features was discussed in detail in three former papers on the testing of visual acuity.[1, 2, 3] Only certain points need be considered here.

DISCUSSION OF TEST OBJECTS

In this respect it will be sufficient to summarize the essential requirements of a good test object, to state the points of disadvantage of the capital letters as test objects, and to note the merits of the test object used in the chart to be described in this paper.

The essential requirements of a good test object. The two important uses of objects for testing visual acuity are to provide a standard measurement or rating of vision and to test the action of the refracting system of the eye.

For making a standard measurement or rating of vision, the test objects should be of such a type as will satisfy the requirements of a rating or measuring scale. These requirements are accurate measurability of detail, serial arrangement according to numerical value, and adequate fineness of gradation or sufficiency of number of steps or divisions in the scale, and so forth.

They are best met by an object having only one critical detail, which is easily measurable and can be accurately constructed according to scale.

For testing the action of the refracting system, not only must it be ascertained whether or not there is a flaw in the imagery but also a defect, when found, must be analyzed in order to apply the proper correction. The former purpose is best served by great complexity of detail in the test object. In the attempt to analyze the defect, however, too great complexity is confusing. We are thus forced to select a test object which will serve both purposes in duly balanced proportion or to use two types of test object, one for the preliminary test, suitable for the detection of a flaw, and the other for the analysis. If both purposes are to be served by the same test object, the task set for the judgment of the patient should, on the one hand, be made as simple as possible, that is, there should be a critical detail; and yet the type of object must be such as to test the resolving power of the refracting system simultaneously in as many meridians as is possible.

In partial summary of the requirements of a good test object the following points may be noted:

(1) A test object which is either adjustable in size or can be furnished in a suitable number of sizes and which can be rotated when desired through 360 degrees presents, perhaps, the best condition. Not only does such a test object, provided with a critical detail which can be presented in different positions as desired, serve every purpose of testing acuity better than a charted series of characters, but its need is great in case of the large sizes of test object. Not enough objects of large size can be presented in charts of the type ordinarily used to satisfy even the cruder requirements of a test. The provision of such a test object is practically limited, however, to the use of the projection method for securing the test field.

(2) The test object should be of such a form or arrangement of detail as to test the resolving power of the refracting system in a single presentation in an adequate number of meridians.

(3) The judgment required should be in terms of acuity, not recognition. Familiar objects such as the letters of the alphabet can be recognized when not seen clearly. The test should be complicated as little as possible by the influence of variable mental factors.

(4) The test object should provide an objective check on the judgment. This is one of the important reasons for using a test object the critical detail of which can be turned at will in different directions.

(5) For the purpose of analyzing the defective imagery it should be possible to test at will the resolving power of the refractive system in any meridian that is desired. This can be accomplished by providing a test object the critical detail of which can be presented in any meridian. A rotatable test object alone can fully satisfy this requirement. It can be partially satisfied, however, by a chart with test objects the critical details of which are presented in haphazard order in different angular positions.

(6) The test object should set a simple task for the judgment, yet the resolving power of the refracting system should be tested simultaneously in as many meridians as possible. As will be shown later, this requirement is admirably satisfied by the type of test object which has been adopted as the international standard; namely, the broken circle.

(7) The test object should be of such type as will satisfy the requirements of

rating vision which are noted above.

(8) If, in a rating scale based on size of object or visual angle, more than one type of test object is used, all that are of the same size should present the same difficulty of discrimination to the eye, at least have the same order of discriminative difficulty. Also they should in relation to the plan of rating neither overestimate nor underestimate acuity. The structural features of many of the letters of the alphabet, for example, are such that they could not be given equal rating in any scale physically determined, and the greater number of them are given a false rating in the scale employed by Snellen.

Disadvantages of test objects of the capital-letter type. For a discussion of the advantages of the capital-letter charts the reader is referred to the second of the papers already cited.[2] Since the purpose of designing a new chart is to remedy the defects of those already in existence, our interest here is particularly in the disadvantages of the capital-letter charts. Both the advantages and disadvantages of other types of chart were also discussed in the preceding papers. We have selected the capital-letter charts for consideration here because of their wide use. The disadvantages of these charts may be briefly summarized as follows:

(1) The different letters set a very unequal task for the resolving power of the eye. The angular value of the details which have to be discriminated in letters of the same size (5 minutes) vary in some charts that are in common use from one to three minutes or more. Furthermore, there is added a wide range of complication as to form. It should be well recognized by this time that the letters used in the Snellen series present a number of well-marked degrees of difficulty of discrimination even when correctly constructed to meet as nearly as possible the 1-to-5-minute requirement of the Snellen scale, yet all the letters in the same line on the chart are given the same value in the unmodified Snellen plan of rating vision. Also it may be noted that in the various series of capital letters planned to subtend a 5-minute angle at the eye which have been used from time to time in the construction of charts and in those which are still being used, the construction of the letters in all cases is by no means the same, and by no means in all is the 1-to-5-minute requirement met.

Just what is meant by the 1-to-5-minute requirement of the Snellen scale does not seem to be uniformly understood. In A of figure 1 is shown the letter E drawn to the 5-minute scale and in B drawn as nearly as possible to the 1-to-5-minute scale. Even in case of the letter E, a very favorable letter for the purpose, it is seen that not all the details which have to be discriminated can be made to subtend a 1-minute visual angle. In C is shown the double-broken circle, the test object adopted for use in the chart to be described in this paper. In this figure it can be seen how easy it is accurately to construct the double-broken circle to meet the 1-to-5-minute requirement when the breaks or openings in the circle are the details to be discriminated.

A very important point to be noted in connection with these test objects is the difference they give in the rating of vision. A test of this shows that with the object given in B, vision is rated around 14 or 15 percent higher and with the object given in A, around 30 to 35 percent higher than with the object given in C. These values will be found to vary somewhat with the intensity of light and the individual. Wherever a

judgment is based on recognition, for example, considerable individual variation may be expected. There can be little doubt which of the ratings as given by the three test objects is the most nearly correct, for the task set by the object given in C is the discrimination of an accurately constructed detail and the judgment is in terms of the power to recognize the detail; while the task set by the objects in A and B is a complicated one of the discrimination of details of various sizes each contributing an indeterminate amount to the total result, and the judgment is in terms of recognition. By common agreement, vision and visual acuity would be defined, we believe, as the power to discriminate detail; yet in the use of test objects of the capital-letter type by the conventional method of testing, we measure vision and visual acuity as the power to recognize objects.

(2) As already noted, the judgment required is in terms of recognition and necessarily has to be because of the type of object used. To be recognized, objects need not be seen clearly. The results obtained are thus not in terms of the function tested and sustain an indeterminate relation to that function. In the use of test objects of the type of capital letters it would not be easy to make the judgment in terms of one or more critical details of uniform and measured size. The judgment in terms of recognition is inherent in the type of test object used.

In previous papers we have discussed and demonstrated the effect of various factors in the determination of acuity. We have not, however, as yet shown the effect of type of judgment and it is not our intention here to do that work in detail. That will be reserved for a later paper. We wish here merely to note the factor and to give some slight indication of the magnitude of its importance. With the test objects shown in figure 1, for example, this can be done in two ways: (a) by comparing the result with the test object given in C with that given in B, as has been done in (1). The test object shown in C is accurately constructed to the 1-to-5-minute scale and that in B as nearly as is possible to that scale. The difference in result, around 14 or 15 percent, is due, therefore, almost if not entirely to difference in type of judgment. (b) By comparing the result when the task set is the discrimination of the 1-minute opening of the letter E, as shown in B of figure 1, with that obtained when the task set is the recognition of the letter. In our test of this point the result obtained for power to recognize the object was again around 14 or 15 percent higher than for power to discriminate the 1-minute opening. In case other letters of the alphabet having a one-minute detail were used, this value would be expected to vary with the form and other structural features of the letter.

It may further be noted that the test of power to recognize belongs of necessity dominantly to the class of what are called specific performance tests, not to the class of basic tests of capacity; that is, the result will vary with the object that has to be recognized. For example, as already noted, there is not equal power for the recognition of different capital letters even when constructed to the same scale. Further, this power will not be the same for other objects as for the capital letters. Obviously, the power to recognize varies both with the type of object and with the individual over and above the power to discriminate detail.

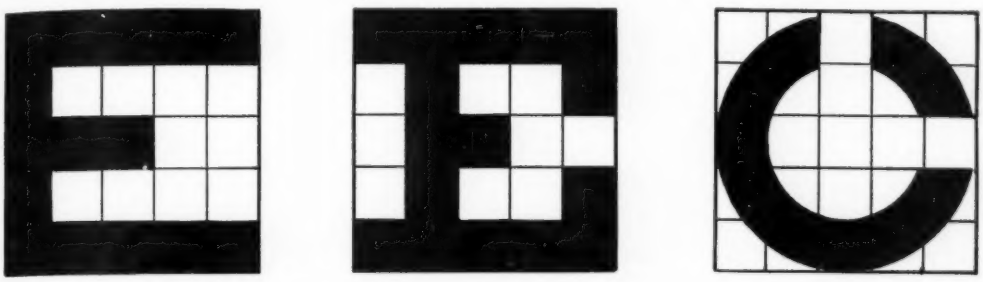
While it may be worth while to test

the power of recognition in a rating of human capacities, the test has to be made for each object separately. The results obtained for no one alone can be taken as measuring the individual's power to recognize. Because of the low transfer value of the results obtained, little general importance is usually ascribed to such tests and they are used no more than can be helped in a program of testing. It can thus readily be seen that it is wrong to make our basic test of vision in terms of the power to recognize and not well to substitute power to recognize for a basic test of vision. Both from the standpoint, then, of correctness of principle and of reproducibility of result from individual to individual and from time to time with the same individual, a type of test should be employed with which the judgment of power to discriminate detail not only can be conveniently used, but is required.

(3) The series of letters may be memorized as the test proceeds. Objects as familiar as the letters of the alphabet are easily memorized, particularly with the suggestion and aid to recall afforded by even a poor degree of vision. In case of any fixed series of familiar objects, memory and recognition go a long way towards defeating the purpose of the test.

(4) There are not enough letters of the same order of difficulty to give the variety needed for repeating the test as many times as are required for completing a refractive correction without detrimental memorization. The same letter, for example, occurs only once in any line and too few others of the same or approximately the same order of size and complexity of detail. This is more or less a difficulty inherent in any fixed series of test objects, but not nearly so much so in charts made up of a single type of object the critical detail of which is presented in different positions, particularly if an adequate number of positions is used.

(5) A considerable number of test objects of the capital letter type must be used in order that the resolving power of the refractive media be tested in an adequate number of meridians. This is particularly true when the judgment is in terms no more exacting than is required for recognition. If all the letters selected were to be used in the different sizes, and in no other way could a fair and accurate comparison be made from



A B C

Fig. 1 (Ferree and Rand). A, the letter E drawn to the 5-minute scale.* B, the letter E drawn to the 1-to-5-minute scale. C, the double-broken circle drawn to the 1-to-5-minute scale.

* In the construction to the 5-minute scale, custom seems to vary with respect to the length given to the middle bar of the E.

line to line either in rating vision or in making a refractive correction, the completion of the series would require the discrimination of an unduly large number of objects. This would cause the eye to become fatigued and vision to blur more than is desirable and more than would be necessary with a series consisting of a single type of object with the critical detail presented in different positions.

(6) When used for the detection of errors of refraction, the results obtained with the capital letters present a complicated picture which can be interpreted only by an exceptionally intelligent and experienced refractionist. With reference to the analysis of a refractive defect the series affords little more help than the printed page. Were it not used in practice in connection with either a rotatable cylinder or crossed cylinders, the location of the meridian of an astigmatism would, for example, be practically impossible. The results of the test itself would give little indication of the location of the defect.

(7) The capital letters do not satisfactorily meet the most fundamental requirements of a measuring scale. The construction of a measuring scale presupposes the selection of a unit or portion of the thing to be measured that is maintained equal in value or magnitude throughout the scale. The Snellen series presents a multiplicity of units—one for each letter used in the series. In such a situation comparison, evaluations, and so forth, are difficult and numerical ratings impossible. Can any one say that the task set by the first line of a chart which contains only the letter L, sustains any known relation to that set by the second line which contains the letters T and E, or to any other line of the chart? In different charts the series consists of 7, 14, 18, 20, and so forth, different letters of the alphabet distributed in various ways in the different lines. This situation is further complicated by the fact that the number of letters used in the different lines may vary from 1 to 8 or 9. Thus, considering either the individual letters in the line or the whole line as a division of the scale, the situation is hopeless for the purpose of numerical comparison or measurement. The use of such a plan in the construction of a scale of physical magnitudes would receive scant consideration; and the test letters as such are, it will be remembered, physical magnitudes and can be treated as physical magnitudes. Any attempt to treat the lines of letters on the chart as divisions in a subjective scale would require an enormous amount of empirical calibration, an amount that has thus far been found to be prohibitive in any department of sensory work. Considering the test letters as physical magnitudes it is obvious that much greater possibilities for rating and measurement are at our command with the use of a well-selected single object of the sizes that are wanted. In such a case, when all other factors that affect our powers of discrimination are held constant, a fairly good approximation to rating and comparative measurement may be made; also the work of diagnosing and correcting refractive errors would be substantially improved.

Merits of the double-broken circle as a test object. Test objects of the broken-circle type satisfy extremely well all the requirements noted earlier in the paper as to the essentials for a good test object.

(1) The task set to the judgment is ideally simple yet the resolving power in the different meridians is tested re-

markably well. That is, when there is an inequality of resolving power in the different meridians, the effect is to give a false location to the opening or to produce the appearance of openings where they are not.

(2) When a sufficient number of positions is used, the results of the test afford directly a great deal of information as to the correctness of focusing in the different meridians. The test series has therefore considerable analytical as well as general merit.

(3) The broken circle, particularly when it is used in connection with a variable illumination as described in our former papers, is a most excellent test object for the detection of astigmatism. The combination with variable illumination affords the most sensitive test for astigmatism we have as yet had the opportunity to try.

(4) When used in positional series the test object provides an ideal objective check on the judgment and one that is effective for children, illiterates, and so on.

(5) The broken circle is exceptionally well suited for the construction of a rating scale. There is but one detail to be discriminated and the form of the letter is such that this can be easily measured and accurately and easily constructed to accord with this scale.

(6) As was noted in former papers,[2, 4] test objects of the type of the broken circle show greater sensitivity and give greater reproducibility of result than the capital letters or the letter E.

As compared with the Landolt circle, or the circle with the single break, the circle with the double break shown in figure 1 C of this paper and described in a former paper,[2] has the following additional advantages.

(1) The two openings positioned 90 degrees apart on the arc of a circle provide a more sensitive test for the resolving power of the refracting media than is provided by the test object with a single opening.

(2) There is further the technical advantage that the test in both meridians can be made simultaneously. Simultaneous comparisons are always to be preferred to successive comparisons particularly when the test is made in the absence of cycloplegia. When made in the absence of cycloplegia this feature is of great service in preventing what is known as selective or meridional accommodation.

(3) The double-broken circle not only provides a more sensitive test of the resolving power of the refractive system for any given position of rotation of the circle, but also the openings may be turned in double the number of directions with a given number of positions of the circle. This is of advantage in the ordinary work of testing acuity and of constructing charts for this purpose, and is of very great advantage in our special test for astigmatism based on the use of the broken circle in conjunction with a variable intensity of illumination. By the use of two breaks or openings in the circle the time required for making this test is reduced one half.

THE TEST CHART

It is the purpose of this paper to present a new acuity and astigmatism test chart. In the construction of this chart the double-broken circle was used as test object. In addition to the selection of a satisfactory test object, the other two important requirements in a test chart are, as already noted, accuracy in the construction of the test objects and the use of a sufficient number of sizes of test object.

In relation to the first of these requirements, accuracy in the construc-

tion of the test objects, we have found not only that all the test objects used in commercial charts do not conform to the 1-to-5-minute requirement of the Snellen scale but that the greater number of them are not accurately constructed to any scale. Again we will confine our observations to charts of the

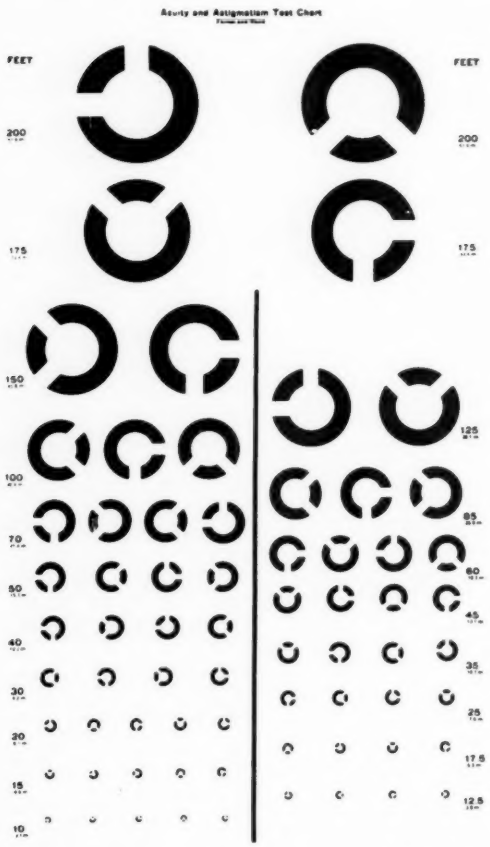


Fig. 2 (Ferree and Rand). A chart for testing acuity and astigmatism. (Copyright 1937 by C. E. Ferree and G. R. Ferree.)

capital-letter type. We have measured the test objects on a number of different models of chart of this type with a micrometer comparator and have found astonishing inaccuracies both as to the size of the letter and as to the angular value subtended by the critical details. In many cases the error amounted to as much as 25 percent. Further, errors were found both in the absolute size of the test objects and in the relation of sizes of objects in the different lines. This revealed to us a new and very important fact in the explanation of the differences in the ratings of acuity obtained for the same person when tested in different places. This, we understand, is a common complaint of those who are required to test the ocular fitness of candidates for various branches of service in the Army and Navy and in other lines of testing service where there is a chance for an intercomparison of results. Other factors contributing to this variability of result are the number of letters selected for use in the construction of the chart (in the charts examined this varied from 7 to 20); the fitness of the letters selected for meeting the requirements of a measuring scale and their distribution in the different lines of the chart; the variability in different charts with respect to the 1-to-5 minute requirement of visual angle; differences in the reflection factor between object and background; differences in the glazing or sizing of the card and in the flatness of the ink; differences in the intensity and diffuseness of the illumination used and the angle at which the light falls on the test surface; the way in which the test is conducted, and so forth.

In making the chart to be described in the present paper great care was exercised both in the construction of the original template and in all photographic reproductions and reductions. It will be readily seen that the fact that we had only a single template to construct instead of 7 to 20, as is the case in the letter charts, was a very great advantage both in the amount of work that was required and in the accuracy it was possible to obtain. Measurements

TABLE 1

SIGNIFICANT DATA FOR THE CHART SHOWN IN FIGURE 2

Capital-Letter Test Charts		Ferree-Rand Acuity and Astigmatism Test Chart							
Line of Chart	Distance at Which 5-Minute Angle Is Subtended (feet)	Line of Chart	Distance at Which 1 to 5-Minute Angle is Subtended (feet)		Breadth of Test Object (inches)	Breadth of Opening (inches)	Visual Angle at 20 Feet (minutes)		Vision	Acuity
			Left Side of Chart	Right Side of Chart			Test Object	Opening		
1	200	1	200	200	3.490	0.698	50.00	10.00	20/200	0.100
		2	175	175	3.053	0.611	43.75	8.75	20/175	0.114
		3	150		2.617	0.523	37.50	7.50	20/150	0.133
		4		125	2.181	0.436	31.25	6.25	20/125	0.160
2	100	5	100		1.745	0.349	25.00	5.00	20/100	0.200
		6		85	1.483	0.297	21.25	4.25	20/85	0.235
3	70	7	70		1.221	0.244	17.50	3.50	20/70	0.286
		8		60	1.047	0.209	15.00	3.00	20/60	0.333
4	50	9	50		0.872	0.174	12.50	2.50	20/50	0.400
		10		45	0.785	0.157	11.25	2.25	20/45	0.444
5	40	11	40		0.698	0.140	10.00	2.00	20/40	0.500
		12		35	0.611	0.122	8.75	1.75	20/35	0.571
6	30	13	30		0.523	0.105	7.50	1.50	20/30	0.667
		14		25	0.436	0.087	6.25	1.25	20/25	0.800
7	20	15	20		0.349	0.070	5.00	1.00	20/20	1.000
		16		17.5	0.305	0.061	4.38	0.88	20/17.5	1.143
8	15	17	15		0.262	0.052	3.75	0.75	20/15	1.333
		18		12.5	0.218	0.044	3.13	0.63	20/12.5	1.600
9	10	19	10		0.175	0.035	2.50	0.50	20/10	2.000

were made to one thousandth of an inch by means of a micrometer comparator. These measurements were made of the original template, of the image on the plate of the camera before the film was exposed, of the developed impression on the film and of the printed test character. In making the measurement of the image on the plate of the reducing camera a special device had to be made for mounting the micrometer comparator. We feel that we can guarantee a most unusual degree of accuracy in the master chart we have constructed. Further we wish again to point out the advantages of the test object selected with respect to the ease and accuracy with which it can be used in constructing a chart. This latter feature has seemed much more important to us since we have checked the accuracy of charts of the capital-letter type.

The second of the above requirements, the use of a sufficient number of sizes of test object, has always presented a great deal of difficulty in the construction of charts. In the capital-letter charts usually not more than 8 or 9 sizes are used and these are so distributed as to test very inadequately eyes of poor and better-than-medium vision. Normal variations of vision with age and intensity of illumination are also very poorly provided for in the selection of sizes that is made. For example, under 10 ft-c of illumination young emmetropic eyes and young eyes well corrected for refractive error are much more apt to have an acuity of 1.5 to 2 than of 1, and a vision of 20/15 to 20/10 than of 20/20. There is certainly no less need for the finer measurements of acuity for the young than for the middle-aged eye and no less need for skill and refinement in the correction of refractive errors. Indeed, extra care in refraction yields its best results in young eyes. Eyes with poor vision also need special care and attention, not so much because of the superior results that can be obtained as because of the great need for improvement and for the detection of small changes in case of treatment. It seems strange that a measuring scale which was established when so little was known about acuity, its measurement and the factors which affect it, should have remained so long with so little change. Certainly, enough is known about these matters now to justify a revision and an adequate standardization.

Further, in the capital-letter charts great irregularity is introduced both in rating and refractive practice by the great variability in the number of test objects employed for the different sizes. For example, in the different charts the number of test objects used may vary from 8 or 9 in the 20/20 line to one in the 20/200 line. There are two reasons for using as many test letters of the same size as possible; namely, to test the refractive power in the different meridians and to prevent memorization. There is an undue and unnecessary liability in respect to this latter feature because the judgment is in terms of recognition. Also because the judgment is in terms of recognition, there is need for a greater number of objects to test the resolving power in the different meridians. In the use of the double-broken circle, there is great improvement in these respects. Only two positions of the test object are needed, for example, to test the resolving power directly in eight meridians, and the danger of memorization is greatly reduced both by making the judgment in terms of power to discriminate detail rather than to recognize and by turning the

opening in the eight cardinal directions in haphazard order in the same line and from line to line.

Perhaps the best solution or provision for the use of an adequate number of sizes of test object so far as charts are concerned, would be to use more than one chart, for example one for eyes of poor vision, one for eyes of medium vision and one for eyes of good vision. By using the double-broken circle as test object we are able, however, to suggest a compromise; namely, the provision of a fairly adequate number of sizes in the same chart so arranged that the additional sizes can be conveniently used when needed and omitted in those parts of the scale which are not critical for the eyes under examination or for other reasons, all of this being accomplished without unduly increasing the size of the chart. That is, on the left side of the chart are arranged the sizes ordinarily used and on the right side the additional sizes in lines corresponding to the spaces between the lines on the left. The two sides of the chart are separated by a heavy vertical line. Two exceptions have been made to this arrangement: (a) three additional sizes have been inserted between the two largest test objects ordinarily employed, and (b) the lines for the two largest test objects of the series so modified are, because of their large size, made to extend all the way across the chart above the upper end of the vertical line.

A photograph of the chart is given in figure 2 and significant data for the chart in table 1. In planning this table we have considered it of interest and importance to give for each size of test object numerical values for such items as breadth of test object, breadth of opening, and the visual angle subtended by test object and opening at a distance of 20 feet. Such data are of importance in the construction of other test objects and test charts and of interest in furnishing both linear and angular measures of the tasks set for the discriminative powers of the eye by the test objects of the various sizes. It is further of interest to know the relation which these linear and angular values sustain to the conventional ratings of vision and acuity. For this reason we have also included in the table the ratings in terms of vision and acuity for the different sizes of test object. The ratings of vision are those ordinarily used for charts of the capital-letter type and the rating of acuity is taken as the reciprocal of the visual angle subtended at the test distance.*

Ordinarily in the use of this test chart the examiner would pass down the left side from the large to the smaller test objects until some difficulty is encountered in discriminating one or both openings. The two sides of the chart should then be used in alternate series until the critical size of the test object is reached. Vision then may be rated in two ways: (a) As is ordinarily the case with the capital-letter charts it may be expressed in terms of a given line plus the number of meridians or positions in which the openings can be seen in the next line, or a given line minus the number of

* To be strictly accurate the sizes of the test object for the 20/20 line should be such as to subtend a visual angle of 1 min. at a distance of 20 ft. plus the distance from the cornea to the nodal point of the eye, this latter distance for the standard eye being accepted as between 7 and 8 mm. (approximately 0.3 inch). The breadth of the broken circle constructed on this scale would be 0.0699 instead of 0.0698 inch. This difference is, of course, too small to be of practical significance.

meridians or positions in which they can not be seen. (b) Vision may be rated in terms of the smallest size of test object in which the openings can be correctly located in at least three of the four meridians in which they are presented. In such a case, the myopic eye or the hyperopic eye under a cycloplegic would doubtless see the openings in all or none of the meridians presented; while the astigmatic eye might see them in only three of the four meridians presented.

In relation to the detection and correction of an astigmatism, the chart is of value in three ways: (a) The test objects themselves provide a sensitive means for detecting the presence of an astigmatism and a fairly sensitive means for detecting its location. (b) Taken collectively they give great sensitivity to the use of a rotating cylinder in detecting the presence of an astigmatism and in locating its axis, much greater than, for example, test objects of the capital-letter type. (c) They also give greater sensitivity in the use of cross cylinders for this purpose.

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COMPARISON OF SUPRARENIN BITARTRATE AND COCAINE PLUS EUPHTHALMINE AS MYDRIATICS FOR ELDERLY PATIENTS

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Cocaine plus euphthalmine seems to be more desirable than suprarenin as a mydriatic unless extreme dilatation is necessary, for it can be counteracted more easily, more completely, and less painfully. On the other hand, cocaine plus euphthalmine appears to have a definite tendency to increase the intraocular tension of the normal eye of the elderly and therefore it is advisable to follow its use by one drop of 0.5 percent eserine. From the Department of Ophthalmology, Washington University School of Medicine.

For adequate study of the fundus oculi in middle-aged and elderly patients, dilatation of the pupil is usually necessary. In the April, 1936 issue of the American Journal of Ophthalmology appeared a paper on synthetic suprarenin as a mydriatic by Horner and Bettman of San Francisco. They reviewed the history of suprarenin and its physiological action, including a bibliography and references. Their studies were made on 74 patients whose average age was 64 years. All eyes were normal except for arteriosclerosis and ametropia. Two drops of 2-percent butyn were used as a preliminary analgesic. Some of their conclusions follow:

(1) One drop was applied to 22 normal eyes and caused maximum dilatation in an average of 53 minutes. The maximum size of pupil in two thirds of the cases was 7 mm.; in the remaining third, 5.5 to 7 mm. A dilatation of 6 mm. resulted in an average of 20 minutes after instillation.

(2) Two drops were used in 43 eyes (with a five-minute interval between drops) and produced maximum dilatation in 44 minutes after the first drop. Maximum dilatation reached 7 to 8.5 mm., but none was less than 6 mm. A dilatation of 6 mm. occurred in an average of 19 minutes after the first drop.

(3) Four drops were instilled in 24 eyes (one drop every 15 minutes for four drops). The average maximum pupillary size was no larger than when two drops only were used.

(4) In 20 eyes dilated to the maximum with two drops of suprarenin, two drops of 0.5 percent eserine solution (the second drop after a 10-minute interval) restored the pupil to normal in an average of 25 minutes. There was often a secondary dilatation of 0.5 to 1 mm. about 30 minutes after the pupil had returned to normal, and this lasted 30 minutes.

(5) Headaches occurred in 54 percent of the patients. These were severe in 29 and mild in 11 patients. The headache was always supraorbital and was readily controlled by 10 grains of aspirin. Certain patients received both suprarenin and eserine. In these the severest symptoms occurred. In three of the 74 there was vomiting; in none did an acute rise of intraocular tension occur.

Their conclusions follow:

(1) For ophthalmoscopic work, two drops of 2-percent suprarenin bitartrate are sufficient and will not only dilate the pupil as much and as rapidly as a larger dose, but may be easily controlled by eserine. This dosage would seem ample for mydriasis except when iris adhesions must be broken up.

(2) The amount of suprarenin has little influence on the speed of dilatation.

(3) Mydriasis from two drops (12¾ hours) lasts 50 percent longer than from one drop (8½ hours). Four drops give the same result as two drops.

(4) A pupil dilated with two drops of suprarenin will return to normal in about 25 minutes if one drop of eserine is in-

stilled twice at 10-minute intervals. This safety procedure is recommended in all cases following dilatation for fundus examination. It takes nearly twice as long (45 minutes) to overcome the mydriasis from four drops of suprarenin.

(5) Headaches are common after administration of suprarenin (54 percent in our series) and are more severe when eserine is used in combination with suprarenin.

(6) A combination of suprarenin and powdered atropine is recommended where a supermydriatic is desired.

The foregoing conclusions indicate that suprarenin bitartrate has a value as a mydriatic. The question naturally arises as to its superiority to other drugs used for dilating the pupil. It was thought that a comparison of the effects of suprarenin bitartrate and cocaine plus euphthalmine might be illuminating. Cocaine plus euphthalmine, 1 percent of each, was chosen because this combination has been utilized for so long a time by a large number of ophthalmologists that it was regarded as being as nearly standard as any mydriatic that would not have strong cycloplegic qualities. Accordingly, a comparison of the two drugs was made in 20 patients of an average age of 57.8 years by instilling suprarenin bitartrate, 2 percent, in one eye, and cocaine, 1 percent, plus euphthalmine, 1 percent, in the other eye. This was done to obtain information on the following points:

(1) Comparative rate of dilatation. (2) Comparative maximum dilatation. (3) Effect on intraocular tension. (4) Comparative control of dilatation by miotics. (5) Comparative comfort of the two drugs. (6) Incidental observations in the series. (7) General conclusions as to the preferable drugs.

In 10 cases the procedure was as follows:

The diameter of the pupils was measured. Two drops of pantocaine, 0.5 percent, were instilled once in each eye. Three minutes later the tension was taken with a Schiötz tonometer. Two drops of suprarenin, 2 percent, were instilled in the left eye and two drops of cocaine, 1 percent, plus euphthalmine, 1 percent, were instilled in the right eye. Fresh aqueous solutions were used. Five minutes after the first drops, the instillations were repeated. Ten minutes after the instillation of the first dilating drops the diameter of the pupils was again measured. One hour later the pupillary diameters were again observed and the tension taken. One drop of eserine, 0.5 percent in castor oil, was used once and the pupillary diameters recorded one-half hour later. The following table shows the results of this investigation:

Observations were made on a second series of 10 patients in which only one instillation of suprarenin and one instillation of cocaine plus euphthalmine were made, as shown in table 2. The purpose of this second series was to determine the comparative effect of one and of two instillations of the dilating drugs.

From the statistics, reasonably definite answers to the seven points of investigation can be made.

(1) In every case recorded in table 1 dilatation was more rapid in the left eye, in which suprarenin was used, than in the right eye. This was also true in those listed in table 2, except in three cases (6, 7, and 9). These cases will be commented on further under special remarks. Ten minutes after the first drop, as shown in table 1, dilatation had progressed approximately one third more in the left eye than in the right; and this was also the case according to table 2, except in the instances cited above. It was therefore obvious that for rapid dilatation, suprarenin is better than cocaine plus

TABLE 1

RATE, AMOUNT, AND CONTROL OF DILATION

TABLE 1

RATE, AMOUNT, AND CONTROL OF DILATION

Case Age Sex	Eye	Pupil diam.	Tension (Schiötz) 3 min. after ½% Pantocaine instilled once mm. Hg	Pupil diam. 10 min. after 2 instillations at 5-min. intervals of Cocaine and Euphthalmine 1% in R.E. and Suprarenin 2% in L.E.	Tension after 1 hr. mm. Hg	Pupil diam. after 1 hr.	Pupil diam. ½ hr. after Eserine ½% in castor oil used once	Remarks
1 51 F.	R.E. L.E.	2.5 mm. 2.5 mm.	12 12	3 mm. 6 mm.	12 12	4.25 mm. 6 mm.	1.5 mm. 3 mm.	R.E. cataractous. Pt. became faint 40 min. after use of eserine. Considerable pain L.E. Eserine used twice with 5-min. interval.
2 50 F.	R.E. L.E.	2 mm. 2 mm.	12.5 14	4 mm. 6 mm.	15 13	6.5 mm. 8 mm.	1.75 mm. (½ hr. 3.25 mm. after eserine)	Eserine 1% used once in each eye. Slight pain in L.E. lasting ½ hr.
3 60 F.	R.E. L.E.	3 mm. 3 mm.	24 24	4.5 mm. 7 mm.	19 17	7 mm. 8 mm.	2 mm. 3.5 mm.	Glaucoma suspect. Severe diabetes with retinal hemorrhage and exudates. No discomfort.
4 69 F.	R.E. L.E.	2.5 mm. 2.5 mm.	17 17	5.5 mm. 7.5 mm.	16 13	8 mm. 8.5 mm.	2 mm. 4 mm.	Minor cerebral hemorrhage 1 wk. previously? No discomfort, twitching each eye.
5 65 F.	R.E. L.E.	2.5 mm. 2.5 mm.	14 14	5 mm. 7 mm.	14 13	6 mm. 7 mm.	2 mm. 4 mm.	Retinal atrophy. Slight twitching each eye, no pain.
6 58 F.	R.E. L.E.	4 mm. 4 mm.	12 12.5	5 mm. 8.5 mm.	12.5 12.5	8 mm. 8 mm.	3.5 mm. 4.5 mm.	Vitreous opacities; early lens changes; slight discomfort L.E. Persisted 24 hrs. (Sinusitis?) Moderate circumcorneal injection. Pupil O.D. 2.5 mm.; O.S. 1.5 mm. Relieved by cocaine and euphth.
7 73 F.	R.E. L.E.	3.5 mm. 3.5 mm.	13 16	4.5 mm. 6 mm.	16 13	6.5 mm. 7 mm.	3 mm. 4.5 mm.	Moderate discomfort in L.E.
8 64 F.	R.E. L.E.	2.5 mm. 2.5 mm.	13 13	3 mm. 6 mm.	17 16	5 mm. 6 mm.	1.5 mm. 3 mm.	Moderate discomfort in L.E.
9 29 M.	R.E. L.E.	3 mm. 2.75 mm.	17 16	3.5 mm. 4 mm.	14 12	8 mm. 7 mm.	2 mm. 3 mm.	L.E. secondary cataract. Blind. Retinal atrophy.
10 57 F.	R.E. L.E.	4 mm. 4 mm.	19 22	6 mm. 7.5 mm.	12 13	8 mm. 8 mm.	3 mm. 3.5 mm.	Cataract in L.E. Twenty-four hours later, redness of each eye and contracted pupils. Redness of L.E. for three days.

TABLE 2

COMPARATIVE EFFECT OF ONE AND TWO INSTILLATIONS OF DILATING DRUGS

Case Age Sex	Eye	Pupil diam.	Tension (Schiötz) 3 min. after ½% Pantocaine 1 instillation mm. Hg	Pupil diam. 10 min. after 1 instillation of Cocaine and Euphthalmine 1% in R.E. and Suprarenin 2% in L.E.	Tension after 1 hr. mm. Hg	Pupil diam. after 1 hr.	Pupil diam. after ½% eserine in castor oil used once; ½ hr.	1 hr.	Remarks
1	R.E.	2.5 mm.	13	2.5 mm.	13	3.5 mm.	2.5 mm.	1.5 mm.	Swarthy complexion, very dark irides
44 M.	L.E.	2.5 mm.	16	4 mm.	13	7.5 mm.	7 mm.	4 mm.	Slight reaction to light.
2	R.E.	3 mm.	12	6 mm.	12	7.5 mm.	2.5 mm.	1.5 mm.	Considerable pain in L.E. after eserine, relieved by cocaine and euphthalmine.
64 F.	L.E.	3 mm.	12	8.5 mm. (20-min. interval)	12	9 mm.	4 mm.	3 mm.	
3	R.E.	2 mm.	24	Not measured	18	4 mm.	Not used		Has chronic simple glaucoma. Slight acute attack 10 days ago. Has been using eserine 1% t.i.d.; none for 12 hrs.
78 F.	L.E.	2 mm.	31		26	4 mm.			
4	R.E.	2 mm.	18	3.5 mm.	19	6 mm.	1.5 mm.		No discomfort.
68 M.	L.E.	2 mm.	22	5 mm.	22	7 mm.	4.5 mm.		
5	R.E.	2.5 mm.	14.5	3 mm.	14	4.5 mm.	2 mm.		Slight discomfort in L.E.
73 F.	L.E.	2.5 mm.	16	5 mm.	13	7 mm.	5 mm.		
6	R.E.	3 mm.	9	5 mm.	9	5 mm.	2 mm.		Old trachoma and bilateral cataracts.
50 F.	L.E.	3 mm.	9	5 mm.	8	4.5 mm.	2.5 mm.		No pain.

TABLE 2 *(Continued)*

COMPARATIVE EFFECT OF ONE AND TWO INSTILLATIONS OF DILATING DRUGS

7 65 F.	R.E. L.E.	2 mm. 2 mm.	12 12	6 mm. 2 mm. Used suprarenin twice in L.E. No. dil. after 1 hr. then used cocaine and euphth. once in L.E.; 10 min. later, pupil 7 mm.	6 6	8 mm. 8 mm.	3 mm. ($\frac{1}{4}$ hr. after eserine) 4 mm.	Two-percent suprarenin produced no dilatation.
8 63 M.	R.E. L.E.	3 mm. 3 mm.	22 22	4 mm. 8 mm. (15 min.)	27.5 17	6.5 mm. 8 mm.	2 mm. 5 mm.	Eserine caused pain in L.E.
9 44 F.	R.E. L.E.	3 mm. 3 mm.	19 19	3 mm. 2.5 mm.	17 24	4.5 mm. 2.5 mm. Hz. 3.5 mm. Vt. $\frac{1}{2}$ hr. later 4 mm. Hz. 4.5 mm. Vt.	1.5 mm. 1.5 mm.	Accommodative spasm or early presbyopia. Neurasthenia.
10 79 F.	R.E. L.E.	2.5 mm. 2.4 mm.	19 19	2.5 mm. 3 mm.				Fairly deep cupping, simulating glaucoma.
11 77 M.	R.E. L.E.	2 mm. 2 mm.	14 14	2 mm. 4 mm.	14 14	5 mm. 6 mm.		Retrobulbar neuritis.
12 65 F.	R.E.	2 mm. 5 mm. after atropine 1% 24 hours earlier 7 mm. after suprarenin 2% 15 min. earlier						Detachment of retina.

Hz. = horizontal diameter.
Vt. = vertical diameter.

euphthalmine; but one must except the small percentage of cases in which suprarenin does not dilate the pupil.

(2) Dilatation after one hour, which was well beyond the period designated as maximum by previous workers, was greater in eight of the 10 patients listed in table 1 in the eye treated with suprarenin than in the eye treated with cocaine plus euphthalmine; and in the two other cases it was equal. In five of the 10 cases of the series in table 2, the suprarenin-treated eyes were more widely dilated than the cocaine-euphthalmine-treated eyes; equally so in two cases, and less in two cases. Two others were not measured. It therefore may be stated that suprarenin, when it acts, generally effects a wider dilatation of the pupils than cocaine plus euphthalmine.

(3) According to table 1, cocaine plus euphthalmine caused an increase of tension in four cases, the minimum increase being 0.5 mm. and the maximum 4 mm.; but in no case did the increase bring the tension above 20 mm. Hg. All of these eyes, when the tension was first taken, measured between 12 and 24 mm. Hg. In one case the tension was not changed by the cocaine plus euphthalmine, and in the remaining four cases it was reduced, the minimum reduction being 1 mm. and the maximum 7 mm. In the series represented in table 2, in which the drugs were used only once, the tension of the right eye, in which cocaine plus euphthalmine was used, was increased in two cases of the nine in which it was taken, the minimum increase being 1 mm. and the maximum 5.5 mm. Tension was unchanged in three cases and was diminished in four, the minimum being 0.5 mm. and the maximum 6 mm. Suprarenin when used twice caused a reduction in tension in seven of nine cases, and produced no change in the remaining two cases. From this it would appear that whenever it might be considered dangerous to use dilating drops, suprarenin, as used in the tests, is safer than cocaine plus euphthalmine, if no miotic is to follow.

(4) As to the comparative control of dilatation by miotics, eserine caused a contraction of the pupils that had been dilated with two instillations of cocaine plus euphthalmine, so that after one-half hour they were smaller than their original size in all of the 10 cases. In those instances in which cocaine plus euphthalmine was used only once the pupil was restored by eserine to the original size or less in all of the seven cases in which it was tested. In those eyes in which suprarenin was used twice, eserine restored the pupil to the original size or less in one case. When the suprarenin was used only once eserine restored the pupil to normal size or less in two cases of seven. From this it may be seen that the dilatation consequent upon suprarenin is much less easily controlled by eserine than the dilatation after cocaine plus euphthalmine.

(5) Relative to the question of discomfort produced by either of the drugs: In this series no discomfort was occasioned by the instillation of either drug (note that pantocaine was used as a preliminary anesthetic); nor was pain caused by the action of eserine in the eye which had been dilated with cocaine plus euphthalmine. This was not the case in the eye treated with suprarenin and later with eserine, however. In the series represented in table 1, pain was experienced in this eye in six of 10 cases. In one of these it persisted for 24 hours. In series two, pain occurred in the left eye in three of the seven cases in which eserine was used. Pain varied from slight to fairly severe, in one case bringing on faintness. The percentage of instances is about the same as that found by Horner and Bettman; that is, 53 percent as compared with their 54 percent.

(6) Certain incidental observations in

this small group of 20 cases are of interest.

(a) Two cases occurred in which suprarenin produced no dilatation: in case 7 (table 2) the pupils were very small. Suprarenin did not dilate the left pupil up to one hour after two instillations; but cocaine plus euphthalmine used at that time was followed in 10 minutes by dilatation to 7 mm. This would suggest that the combined action might be valuable in case of failure of suprarenin. In case 10 (table 2), dilatation was minimal in each eye. This patient, however, had either an accommodative spasm or early presbyopia. She required a +2 D. spherical addition to her distance glasses at the age of 44 years, though the possibility of the age being incorrectly given must be considered.

(b) The patient in case 12 (table 2), was treated with atropine, 1 percent, in an eye of which the pupil measured 2 mm. Twenty-four hours later the pupil was dilated to 5 mm. Two-percent suprarenin caused an increase of dilatation to 7 mm. after 15 minutes. This suggests the use of suprarenin as an adjunct to atropine for dilatation. Further evidence of the increased effect of suprarenin added to atropine is the power of the latter to break adhesions in an acute iritis when atropine alone or even atropine and cocaine combined have failed to accomplish this.

(c) Case 3 (table 2) was interesting in that it was a case of chronic simple glaucoma. Very little dilatation was produced by either cocaine plus euphthalmine or suprarenin; and the tension was reduced 6 mm. by the former and 5 mm. by the latter.

(d) Case 10 (table 1) was peculiar in that the contraction, following eserine used only once, lasted three days and was associated with circumcorneal injection and spasm of accommodation.

In the article by Horner and Bettman, a very severe attack of glaucoma was induced by suprarenin in a patient in whom there had been apparently no glaucoma previously. This is not the only report of such an occurrence which can, indeed, follow the use of any mydriatic and is probably not more frequent after suprarenin than after other dilators. (Note that in our series it did not cause a rise of tension in any eye.)

(e) The average increase in diameter of the pupil one hour after one instillation of cocaine plus euphthalmine in nine cases was 2.78 mm., while that after two instillations was 3.8 mm. in two cases. There was quick reduction in pupillary diameter to a size equal to or less than that before treatment in every case irrespective of whether drops were used once or twice, and better dilatation was induced by the latter method. Hence it would appear to be preferable.

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THE DUST FACTOR IN THE PRODUCTION OF PTERYGIUM

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It is maintained that dust is not the factor in the production of the pterygium; that statistical studies, coming from reliable sources—hospitals under guidance of the American Medical Association and the American College of Surgeons, and of confrères, members of the College—justify the correction of a belief that has existed throughout the ages. One hundred thirty-five thousand eye operations entered into the study. Louisiana, the verdure-clad state with greatest percentage of pterygiums operated upon, is contrasted with states in the dust bowl. The surgeons at the Charity Hospital of New Orleans operate on women for pterygiums equally as frequently as upon those of the opposite sex. Progress in the pathogenesis of the pterygium enigma is held possible only if the dust hypothesis is excluded. It is possible then to explain the pterygium surgery, not at the present time understood, and to advance the polyp hypothesis which reasons a development from a polyp to a pinguecula, advancing into a pterygium. From the Department of Ophthalmology, Louisiana State University Medical Center.

It is generally thought that the pterygium is provoked by irritating substances entering the eye. This may be true; but what that substance is, is not known. Many believe that alkali dust[1] is the particular agent, yet all agree that that agent requires an arid climate for its action. The pterygium is not observed to any great extent above the 37 degree latitude. Dust, the surface of the earth, and that of mines, manufacturing plants, railroads, acting as a physical agent, is implied by many writers as the factor, and the agriculturist, sheep herder, miner, railroad employee are selective victims of the disease in the opinion of many.[2, 3, 4]

The writer notes that the pterygium is very common in the housewife. Either agent may be the factor in its genesis, yet how is to be explained its occurrence in the United States in sections where each of these agents is at a minimum? For example, the dust of North and South Dakota is in contrast with its absence in Louisiana, and the same agent in industrial Detroit and Pittsburgh with that in comparatively nonindustrial New Orleans. The first sections show practically no pterygiums whereas in the latter pterygiums are prevalent.

A pterygium-geography study of the United States of America was made,[5] the purpose being to find an explanation for the great number of pterygiums in Louisiana, and particularly in New Orleans and Shreveport, the two most important cities of the state, one in the northern and the other in the southern part. In neither of the two cities is there an alkaline soil nor is the climate arid; furthermore, these cities are not to be classified as industrial. The statistical information that has been previously submitted on this subject came from hospitals accredited by the American Medical Association and the American College of Surgeons. The deductions were from a study of pterygium opera-

[1] McReynolds, John O., The Ophthalmoscope, March, 1934: "The pterygiums are produced by the prolonged irritating action of several factors, chief among which are heat, a dry atmosphere, high winds, exposure to sunlight and an abundance of dust, and especially alkaline in character."

[2] Treigny and Coirre, "Le Pterygium Monograph," page 35: ". . . the ultimate prognosis is proportionally better as the individual operated upon will have been protected or completely removed from the causes of conjunctival irritation to which he was exposed."

[3] Annemann, Heul, quoted by Treigney and Coirre, "Le Pterygium Monograph," page 35: ". . . that the pterygium could truly be attributed to profession. *The railroad companies in France decided to exclude persons who had pinguecula.*"

[4] Junes, of Tunis, quoted by Treigny and Coirre, "Le Pterygium Monograph," page 49: ". . . in those who till the soil and are exposed to dusty winds," and Monfette of Montreal: "the agriculturist."

[5] Dimitry, T. J. Pterygium geography for the U.S.A. The Eye, Ear, Nose & Throat Monthly, March, 1935.

tions as compared with the ocular operations at the hospitals of the nation. The total figures were 135,000 eye operations, ample for drawing deductions. They revealed that New Orleans and Shreveport had a greater number of pterygium operations than any other cities in the nation. However apparently satisfactory these figures may appear to be, they did not include all parts of the nation. Some sections could not contribute for lack of hospital accommodation or because the people were not hospital conscious, and other sections, where it was possible, were often insufficient in number to be included in the study. Hence, there was obtained from confrères, members of the American College of Surgeons, their impression as to the incidence of pterygium in the district in which they lived. The information they furnished is added to that which has previously been compiled and published.

The result is accepted as a fairly accurate survey of the prevalence of pterygium in different sections. It is submitted in a map (figure 1). The percentage for each state is recorded; two states are missing. The number placed in the state on the map is the percentage. The shading shows an area of increased occurrences. With these figures accepted, charts were made of irritants common to the various areas of the country, and were compared with the pterygium chart (the part shaded on the map) so as to include or exclude certain agents as responsible for the disease. Weather reports, rainfall, and temperature were also given consideration. Even the rays of the sun were not omitted. Other statistical findings made from a study of race, sex, age, and so forth, in the United States were compared with the pterygium map, all with two purposes in mind: first, to find an agent that could be held responsible for provoking the

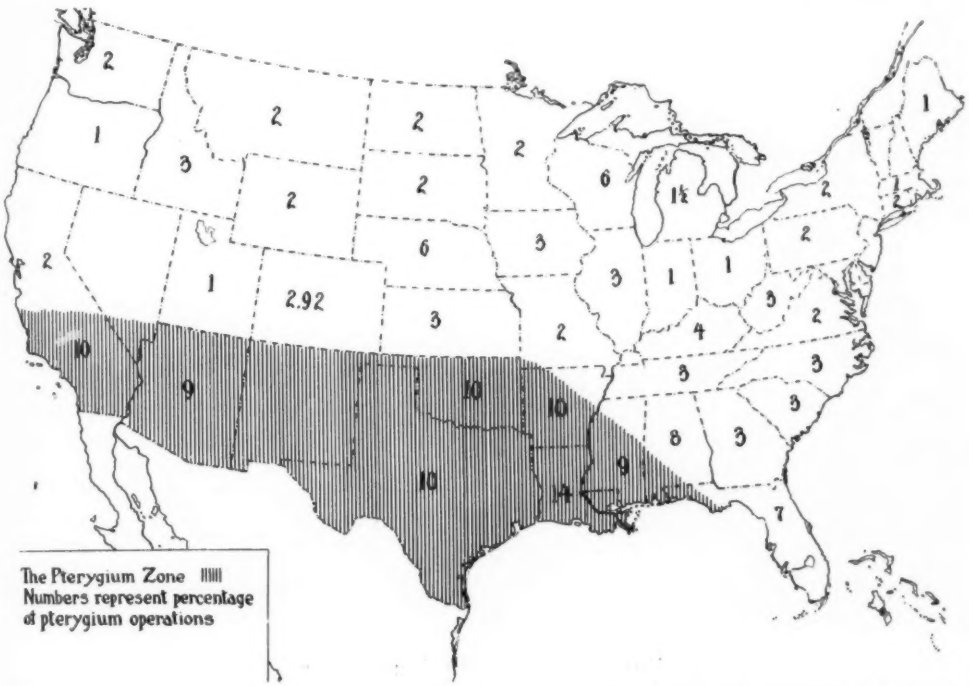

Fig. 1 (Dimitry). A map of the United States showing (shaded area) the greatest incidence of pterygia.

growth, and, second, to be able to record information that may prove of greater value than the surmises dating from the earliest period in history. After having done all this work, it is not found necessary to submit the charts for publication. A small map of Louisiana offers sufficient evidence to contradict the explanation tors as wrong. Probably no state in the Union has less dust. Compare this with the section of the dust bowl, yet a very insignificant number of pterygium cases occur in the latter. The sheep herders and cowboys in these windy, alkaline, arid sections do not suffer with pterygiums as compared to the housewives in the

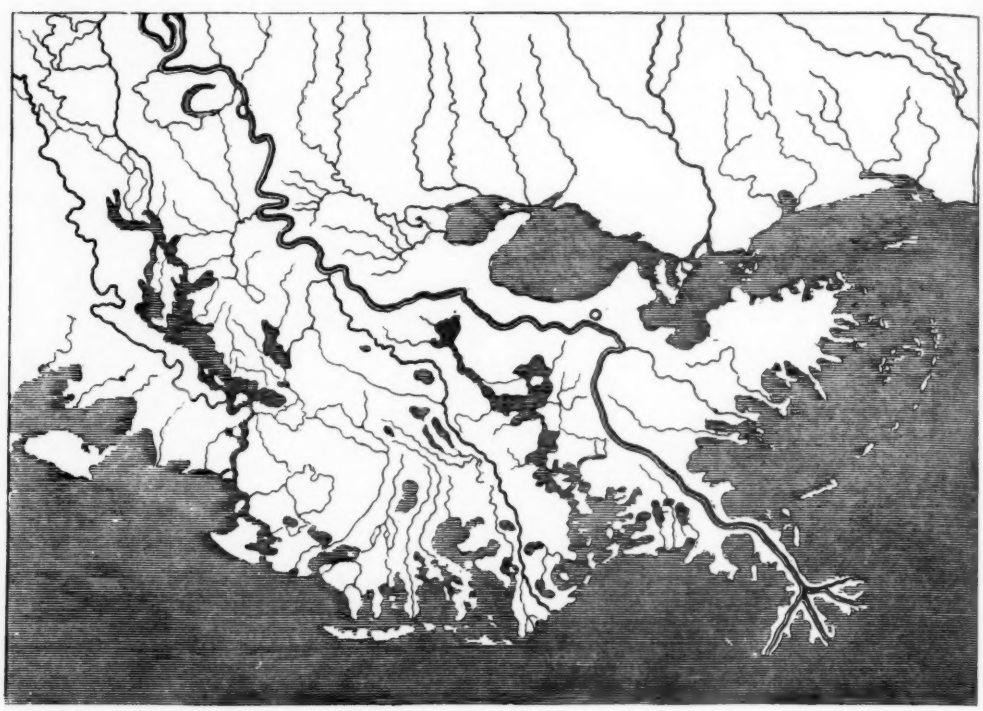

Fig. 2 (Dimitry). Map showing the location and environment of New Orleans, the city of greatest incidence of pterygia. The prevalence of streams and lakes would contradict the theory that dust is the factor in its production.

usually given. A geological map of the lower part of the state is submitted (figure 2) for consideration and shows that the rivers, lakes, and bayous in this state are everywhere. The land is constantly moistened by them.

The very high pterygium incidence in New Orleans, a city with a mean temperature of 68.2 degrees, a relative humidity of 63 percent, a soil naturally irrigated, and water in superabundance, exposes certain implied etiological fac-

Louisiana section. All agree that children do not have pterygiums whether they reside in hot, cold, or industrial localities.

Why warmth should encourage the disease in one state and not in another is unexplained, and why cold weather should discourage it is also unanswered. The cold zones of this nation domicile the industries and should have pterygiums if irritants excite the growth. The sections of coal mines and quarries are not the location of prevalence. Sandy lands and

dust storms are more common in the colder climes, yet show no pterygiums; that is, comparatively speaking.

Moreover, the climate of New Orleans is warm. It is a city of evergreens and foliage nurtured by the natural streams and lakes that are everywhere. The rains are plentiful and the soil is a rich clay. The rays of the sun are moderated by the humidity; yet in this city, the pterygium is most prevalent.

In certain areas of the colder climes, surgeons assign the cause as occupational; for instance, it is found in railroad employees, in those employed in grain elevators, in mechanics, and so forth, and in farmers, sheep herders, and cowboys. This may be correct for the colder climes, where a few cases are noted, but in the warmer zones it is commonly observed in the housewife. In the author's clinic of the Charity Hospital of the City of New Orleans, fully 40 percent of those operated on for pterygium are women and the number of operations is great. An examination of 150 traffic policemen of the City of New Orleans did not reveal that the pterygium or pinguecula was greater among them than among 150 medical students at the Louisiana State University Medical Center; in fact, the percentage was the same, and if dust and irritating substances were the cause, the police should have shown the greater incidence.

Why should Louisiana have a larger percentage of pterygiums than Alabama, Georgia, and Florida? And why should Southern California have a larger percentage of pterygium operations as compared with Northern California. The temperature is almost the same in these southern sections. Why is there a distinct area for greater pterygium occurrence extending west from the Mississippi to the Pacific Coast between the latitudes of approximately 37 and 30 degrees? It was thought that map studies would answer the problem. They may do so when further analyzed, but at this reading they have not revealed the factor. They have, however, excluded dust.

Of all the geological substances considered in a search for a particular agent, there is but one that parallels the pterygium geography; namely, that of oil lands.

Louisiana is potentially the greatest oil-producing state in the United States. Southern California, Texas, and Oklahoma are next in order after Louisiana both in pterygium prevalence and in oil lands. The possibility that oil is responsible for exciting the growth leads onward in a research that is, however, not very promising.

A letter was addressed to ophthalmologists throughout the nation, particularly in sections where information had not been obtained from hospital reports. Their replies are submitted herewith, and these answers give a reason for formulating a hypothesis contradicting the theory that dust is a factor.

THE REPLIES FROM THE DIFFERENT SECTIONS NOT INCLUDED IN THE CHART PREVIOUSLY SUBMITTED

Alabama. Dr. Samuel Kirkpatrick: "though the soil is sandy and of limestone, plenty of wind and dust, yet the percentage is not greater than 5." Dr. H. B. Searcy: "about 10 percent"; while Dr. J. D. Perdue on the Gulf and Dr. Paul S. Mertins, farther north, would give it as 15 percent. Dr. K. W. Constantine: "there are not very many cases—about 1 percent."

Alabama is accredited with 8 percent.

Arizona. Dr. B. L. Melton: "8.3 percent and mostly prevalent among the cowboys."

Arizona is accredited with 8.3 percent.

Arkansas. Dr. H. Moulton: "the climate is humid with very little wind, which rather upsets the theory that pterygium is more prevalent in windy, dry countries. There is a fair proportion of housewives who suffer with pterygium." Ten percent agreed upon by Doctors Raymond T. Smith, Zuber N. Short, Martin V. Russell. Dr. E. M. Hudson and Dr. R. J. Calcote: "8 percent."

Arkansas is accredited with 10 percent.

North Carolina. Dr. R. W. Petrie: "less than

15 percent." Doctors C. W. Banner and William Elliott both agree that there are very few and less than 3 percent.

South and North Carolina are accredited with 3 percent.

South Carolina. Dr. E. W. Carpenter and Dr. S. Lucas: "15 percent." Dr. Walter Bristow: "1 percent." The hospital reports were 1.40 percent.

North Dakota. Dr. Archie D. McCannel that "it is not common."

North Dakota is accredited with 2 percent.

South Dakota. Dr. L. Grosvenor: "seven operations in 24 years." Dr. C. E. Robbins notes: "it never grows large enough to encroach upon the cornea." Dr. H. Saylor: "very small number." Dr. J. M. Walsh: "Rapid City is 35 below and 110 above almost every year. Strong winds, dust storms. The sun shines 300 days annually. With the theory advanced, it should be very prevalent but it is not."

South Dakota is accredited with 2 percent.

Florida. Dr. A. K. Wilson (Jacksonville), Dr. P. De Boe (Miami): "very few pterygiums, less than 5 percent." Dr. L. Ingram: "less than 5 percent." Dr. M. A. Lischkoff (Pensacola): "15 percent." Hospital reports gave Florida 4.29 percent.

Florida is accredited with 7 percent.

Georgia. Dr. P. Calhoun and Dr. Arthur Fort: "less than 1 percent." Dr. Ross P. Cox: "not more than 3 percent."

Georgia is accredited with 3 percent.

Idaho. Dr. R. L. Nourse that his state "is a very dry state with considerable alkali dust and strong winds, yet the cowboys and the sheep herders do not suffer more with pterygiums than does the farmer or other citizens." Dr. C. W. Pond and Dr. Alexander Barclay both agree that the pterygium is not very common.

Idaho is accredited with 3 percent.

Iowa. Dr. Sidney G. Hands: "it is rarely seen, six operations for pterygiums in 30 years." Dr. Fred F. Agnew: "it simply does not exist in this locality." Dr. J. E. Rock sees "a very occasional case." Dr. E. G. Linn: "not prevalent." Dr. R. M. Lapsley: "a very small percent." Dr. C. M. Werts: "perhaps less than 1 percent." Dr. F. W. Dean: "not sufficient in number to calculate." Dr. H. D. Fallows, Dr. F. Reuling, Dr. Henry A. Bender, Dr. T. U. McManus, Dr. J. A. Thorson, Dr. Charles P. Frantz, Dr. C. S. O'Brien, Dr. Geo. Albright, Dr. W. F. Boiler, all agree that it is less than 3 percent.

In the chart, Iowa is accredited with 3 percent.

Kansas. Dr. George H. Allen: "a very small number of operations for pterygiums, four to five yearly." Dr. W. W. Reed, Dr. M. Brownwell, and Dr. Ira Chadwick agree that "the growth is not common." Dr. Charles T. Moran says he has had 3 to 5 percent in the past five years.

Kansas is accredited with 3 percent.

Kentucky. Dr. Milus L. Gunn, Dr. R. W. Bledsoe, Dr. R. M. Armstrong: "exceedingly small, less than 1 percent." Dr. W. A. Weldon: "5 percent." Dr. H. N. Ritter: "very little seen." Dr. Errett Pace says "less than 5 percent."

Kentucky is accredited with 4 percent.

Maine. Dr. Oliver W. Turner: "not more than 0.5 percent." Dr. S. L. Andrews: "never in a female." Dr. W. R. McAdams says that it is so seldom seen that he often wonders "whether there is such a thing."

Maine is accredited with 1 percent.

Michigan. Dr. R. D. Sleight: "it is very rare." Dr. C. B. Fulkerson: "negligible." Dr. W. Haughey: "very small percentage"; and the others, Doctors Edward Wernstein, George Hardie, B. J. Holton, William Fowler, all agree that "it is less than 2 percent." Doctors Mac D. Campbell, Claude Walker, Laura Lane, George Frothingham, George Hardie that "it is less than 1 percent."

Michigan is accredited with 1.5 percent.

Minnesota. Dr. L. W. Morsman, "0.1 percent, yet he is a surgeon in a large iron-mining district. Dr. John S. Macnie, Dr. D. L. Tilderquist: "less than 2 percent." Dr. C. L. Oppegaard, "about 5 percent" and this is agreed to by Doctors W. E. Camp, Charles N. Spratt, G. H. Walker, Lloyd Dack, A. Wheeler, and C. Larsen.

Minnesota is accredited with 1 percent.

Mississippi. Dr. Lucien Sidney Gaudet of Natchez on the Mississippi River: "of 64 pterygia operations, 19 were from Mississippi, 42 from Louisiana, Arkansas furnished 2, and Alabama 1. The people of Mississippi are farmers so should have the same as other farming states. If there is any difference in irritating soil, it would be more unfavorable for Mississippi." Dr. A. G. Wilde: "our condition in its causation must be vastly different from Louisiana as they are scarce, 16,000 eye patients considered." Dr. William F. Cotton: "there is a large number of pterygiums in Mississippi." Dr. Edley Jones had "20 pterygium operations in the last 12 months." Dr. W. B. Dobson: "5 percent"; Dr. D. E. Staton: "10 percent"; Dr. G. G. Armstrong: "20 percent"; Dr. Billy S. Guyton: "15 percent"—he has never seen so many pterygiums as in those sandy hills of Mississippi.

Mississippi is accredited by these reports with having 9 percent, a percentage doubtfully as great as Louisiana.

Montana. Dr. William R. Morrison: "One percent—there does not seem to be any occupational factor in this condition. It is as frequent in those who work inside as those who work out of doors." Dr. Lawrence G. Dunlap: "high dry climate yet less than 0.1 percent." Dr. E. H. Rowen: "very few." Dr. A. W. Morse: "about 5 percent."

Montana is accredited with 2 percent.

Nebraska. Dr. Charles H. Campbell: "six operations in a year." Dr. George B. Porter: "5 percent"; Dr. Philip Romonek: "2 percent"; Dr. Earl Brooks: "15 percent"; Dr. Eugene Foote: "10 percent."

Nebraska is accredited with 8 percent.

Tennessee. Dr. E. C. Ellett: "it is not at all common. Those seen are comparatively mild. Not more than 2 percent." Drs. A. C. Lewis, M. M. Cullom, S. Lawwill: "a very small part of our surgery." Dr. D. H. Anthony: "10 percent."

Tennessee is accredited with 3 percent.

With these facts before us, it can be concluded that dust as the prime factor in the production of the pterygium is eliminated, and that the discovery of its greatest prevalence in verdant soil leads from a confused theory to a definite explanation. The figures submitted are not mere assumptions and are valuable because they are not.

The "dust devils" dancing down the road are thought by Elliot to be the factor in tropical India, but in this country the dust bowl furnishes fewer cases than the verdure-clad soil of Louisiana.

Conclusion

The question as to the etiology of pterygium nears solution with the elimination of dust as the heretofore recognized cause.

St. Charles at Napoleon Avenue.

PREVENTION OF OCULAR COMPLICATIONS IN TRYPARSAMIDE THERAPY

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The value of tryparsamide as a therapeutic agent in neurosyphilis has been well established. There are still many clinicians, however, who hesitate to use this drug because of its notoriously injurious effects on the eye. Under a simple plan of spaced routine examinations, 132 patients were given more than 1,800 injections of tryparsamide with permanent, but not disabling, impairment of the field of vision in three patients. These accidents were avoidable. The contraindications to tryparsamide therapy are discussed. The literature on the subject is reviewed. From the Department of Ophthalmology, Stanford University Medical School.

Since the introduction of tryparsamide in the treatment of neurosyphilis by Lorenz, Loevenhardt,[1] and their coworkers in 1923, its value as a therapeutic agent in advanced neurosyphilis has been placed higher and higher. Almost all investigators in recent years have reported enthusiastically upon its use. In his monograph on the treatment of syphilis Moore[2] writes: "The first striking effect of the drug is usually a gain in weight and improvement in the general physical status of the patient. In paresis, remissions occur in about 30 percent of the patients treated and in tabes and diffuse meningovascular neurosyphilis, symptomatic improvement is often prompt and satisfying." Stokes[3] in his classical textbook evaluates tryparsamide in these terms: "Certain it is that no drug of corresponding effectiveness in syphilotherapeutics has a smaller margin of inconvenience . . . than tryparsamide." On the other hand, concerning the hazard of ocular complications there has been much less unanimity. The work of Pearce and Brown[4] as well as previous experience with the use of atoxyl pointed out sharply the danger to vision in the administration of tryparsamide. In the treatment of 77 cases of trypanosomiasis with tryparsamide, Pearce[5] reported the occurrence of visual disturbance in nine, in three of which there was permanent damage. This rather terrifying incidence led sub-

sequent investigators to proceed very cautiously and resulted in great hesitancy among practitioners in adopting the use of a drug which, while it had undoubted therapeutic value, carried with it so great a risk. This distrust exists to the present day and undoubtedly many patients with neurosyphilis have been deprived of the benefits of tryparsamide because of it. A still further cause for alarm existed in the fact that many neurosyphilitics had preëxisting damage to the visual apparatus. Because of reported menace from tryparsamide this large group was removed from treatment with the drug. Lorenz and Loevenhardt, in introducing the use of tryparsamide in the treatment of neurosyphilis, had warned that, "Tryparsamide possesses the potentiality of injuring the optic tract and should not be used in cases showing degenerative changes in the retina."

On the other hand, while there are some who believe that tryparsamide is a drug to be entirely condemned, there are still those who continue to give it without the benefit of a thorough ophthalmologic examination. Dr. Harry Pollack, discussing a paper by Roth,[6] stated: "I attended a meeting of the Chicago Neurological Society when this treatment was brought up and all the neurologists spoke as Dr. G—— did today. They warned one another of the evil effects on the optic nerve but with one exception they did not have the coöperation of a trained ophthalmologist."

The confusion which surrounded the question of the hazard from tryparsamide took on a special significance for the authors when we were asked by the Neurosyphilis Clinic of Stanford University Medical School to cooperate in the handling of patients receiving tryparsamide. The obvious problems were: (1) What are the contraindications for such treatment? (2) What examinations should be made to safeguard the patient? (3) How often should such examinations be made? In connection with the last problem varied opinions have been given in the literature, ranging from those who demanded a complete ophthalmologic examination before and after every injection to those who feel that an objective examination is indicated only when the patient complains of subjective phenomena. While in dealing with individual cases in a private practice, examination before each injection is not a great burden, the handling of a large group of such cases necessitates the establishment of a minimum compatible with safety.

The question of what constitutes a definite contraindication to the use of tryparsamide brings up again the mode of action of tryparsamide on the visual pathway. It is generally accepted that tryparsamide has a specific toxic effect on the fibers of the optic nerve. Experimental evidence indicates that this toxicity depends upon the presence in an organic arsenical, of an amino or substituted amino group in a "para" position to the arsenic, and not so much on the valence of the arsenic.[7] Such an arrangement is present in tryparsamide (sodium salt of N phenyl glycine amide p—arsonic acid). Young and Muehleberger[8] observed that certain individuals excreted tryparsamide very much more slowly than the majority and suggested a possible cumulative effect in these people. Because of large numbers of accidents which occurred in the early days of tryparsamide treatment of neurosyphilis, there were many who felt that the drug in some way accelerated a subclinical early luetic

atrophy. Such a view must completely disregard the accumulated experimental evidence[5, 7, 9, 10] with this and other drugs of this series (notably atoxyl) and the occurrence of visual disturbances in individuals without any syphilitic lesion, as reported by Pearce. The rather rapid contraction of the visual field, the maintenance of good central vision, the prompt recovery if the drug is stopped early, the subjective phenomena, and the slow appearance of optic atrophy in tryparsamide amblyopia all point to a specific toxic action of tryparsamide. It is not a corollary, however, that the effect of tryparsamide on the normal optic nerve and on one previously damaged by syphilis is identical. In order to estimate more accurately the hazard from tryparsamide and to determine definite contraindications a survey of the clinical literature was undertaken.

In 1924 Woods and Moore[11] reported the visual disturbances in a series of 241 patients who had received a total of 3,000 injections. The gross incidence of ocular complications was 17.8 percent. Of this 10.2 percent were subjective, 5.5 percent objective (fields or fundus changes), 2.1 percent questionable. The incidence of permanent damage of any type was 4 percent. Eighty percent of reactions occurred before the fifth dose, 94 percent before the tenth. They concluded that the dose of the drug had no bearing on the reaction and that, "preëxisting syphilitic disease of the retina and optic nerve were not necessarily a contraindication." The latter conclusion may hold true if one compares the incidence of complications in cases with and without preëxisting syphilitic disease of the retina and of the optic nerve (33 percent as opposed to 21 percent in this series). However, if one selects from this series the 12 patients who showed involvement of the optic nerve alone, five of these had ocular complications (42 percent), a striking figure. More recently Moore has considered lesions of the optic nerve a definite though not absolute contraindication to tryparsamide.

Lillie,[12] citing his observations in a series of 114 cases of syphilis of the central nervous system concludes that: (1) Ocular changes occurred as often with arsphenamine as with tryparsamide. (2) The use of tryparsamide is not contraindicated by changes in the fundus. (3) Tryparsamide was no more harmful to the eyes than any form of arsenic used in syphilis of the central nervous system.

Here, again, if one analyzes the statistics, the deleterious effect of tryparsamide on an optic nerve that has been previously damaged becomes apparent. Of the 13 cases in the 114 in which objective or subjective ocular complications occurred, nine had preëxisting changes in the form and color fields, including one with pale optic disc. Only four of the 13 showed no preexisting changes in fields or fundus. Of four patients in the 13 who showed objective changes, three had had previous contractions of the visual field. In the entire series of 114 there were 29 with preëxisting field defects for form or color, not all related to a lesion of the optic nerve. The incidence of complications in this group, therefore, was 31 percent as opposed to an incidence of 4.5 percent in the group without previous changes in the visual field.

Dancy,[13] writing on ophthalmoscopic examinations during treatment with tryparsamide, states, "It is my experience that changes in vision and fields are more extensive in untreated

cases of syphilis than in cases treated with tryparsamide. All the ocular changes take place as frequently during the use of other arsenicals, and the use of tryparsamide is not contraindicated in my opinion where we have fundus changes. And it is my opinion that changes in vision and field are temporary and that the value of tryparsamide . . . outweighs possible objections to its use. . . ." One is led to infer from this that the disturbances occurring in the course of tryparsamide therapy are not related to the use of the drug but are part of the syphilitic disease. One cannot neglect, however, the striking visual symptoms which often accompany the use of tryparsamide and do not occur in optic atrophy nor in optic neuritis due to syphilis, or the prompt recovery which takes place when the drug is stopped.

It is the opinion of Neff[14] that the existence of syphilitic changes in the optic tract do not constitute an absolute contraindication to tryparsamide. "The drug is used in a serious medical situation and some hazard must be assumed just as is taken in other medical and surgical procedures of a less serious character." His report was concerned chiefly with 15 patients having definite pathological changes in the eyes, who were treated with tryparsamide. Four of these complained of subjective disturbances, four showed decrease in the visual fields. Since the last four all had preëxisting optic-nerve damage, the evidence is inconclusive.

Moore and Sutton[15] speak highly of the use of tryparsamide in late syphilis of the central nervous system. Of the ocular complications they say, "Small doses of the drug by acting as a stimulator of subactive optic-nerve lesions may cause serious difficulty. Treatment should be stopped for several weeks after subjective symptoms."

An excellent summary was presented by Cady and Alvis[16] in 1926. They treated 180 patients with tryparsamide, 153 having normal ocular findings and 27 abnormal, including 16 with optic atrophy, 10 with constricted fields, and one with chorio-retinitis. In the first group there was a 5-percent incidence of ocular complications and a 1.3-percent of permanent damage. In the second group 10 patients (37 percent) became definitely worse. Of the 16 patients with optic atrophy six became definitely worse, three of them blind, an incidence of 37 percent, corresponding closely with the similar group in the report of Woods and Moore (42 percent). The authors concluded: (1) Tryparsamide can be used by experienced persons with comparative safety on patients having normal optic tracts. (2) Patients with optic-nerve involvement such as contracted fields or abnormal fundi are more liable to injury by treatment. (3) Occurrence of subjective symptoms should be investigated for an objective basis. If no objective signs are found tryparsamide may be continued, with caution. The presence of objective findings is a contraindication for further tryparsamide for at least a month, when it may usually be resumed.

Roth,[16] observing a small number of cases felt that tryparsamide could be used without injury to the optic tract.

In his report of a case of atrophy following tryparsamide treatment King[17] concludes "That subjective signs should be thoroughly investigated for an objective basis and if not found treatment may be continued but with caution."

Insofar as general reactions from

tryparsamide are concerned, Phelps[18] reported a series of 4,488 injections with only one mild reaction. No mention is made of ocular complications.

Casten[19] collected from the literature 1,254 cases treated with tryparsamide up to 1930 and calculated the incidence of permanent visual damage as 2 percent. He reports one case in which there occurred sudden loss of field and vision after two injections of tryparsamide, with rapid recovery after forced spinal-fluid drainage.

Mayer and Smith[20] have reported on a group of 87 patients with syphilis of the central nervous system who were treated with tryparsamide, including 15 with optic atrophy. They state that five of the group had ocular complications. Three of the reactions were in patients with optic atrophy, two returned to the original state when tryparsamide was discontinued. They conclude: (1) Tryparsamide, intelligently administered, causes no increase in atrophy of the optic discs, where syphilis has previously caused changes. (2) Tryparsamide causes no optic atrophy in cases where the action of syphilis has not affected the discs. (3) The use of tryparsamide under proper dosage and supervision should have only a beneficial effect on the optic nerve.

The qualifying phrase in the last conclusion would indicate that the first two statements are not without exception. The early reports on the toxicity of tryparsamide leave little doubt that a preëxisting syphilitic lesion is not necessarily requisite to a harmful reaction.

In reviewing the evidence in the foregoing articles one cannot escape the impression that, despite a few reports to the contrary, the incidence of reaction in patients with preëxisting optic atrophy or contractions of the visual fields indicating a beginning atrophy is definitely higher, and that such preëxisting lesions constitute a distinct contraindication. On the other hand, there is no evidence that lesions of the retina, optic tracts, or optic radiation are aggravated by the use of tryparsamide. Nor does there seem to be any relationship between dosage and the incidence of reactions. Finally, over 95 percent of unfavorable reactions occurred before the tenth injection.

The question of the nature of the ophthalmic examination necessary to safeguard the patient naturally depends on the early symptoms or signs which herald a reaction. In practically every instance where objective signs of toxicity occurred in our patients, a history of previous symptoms was obtained on closer questioning. These symptoms are variously described as blurring, dazzling, smokiness, appearance of heat waves, appearance of corrugation, a bright object rushing past the eye, glare, shimmering. One must bear in mind that the blurring of vision which these patients report is not a diminution in visual acuity but a paresthesia. While such symptoms are undoubtedly present in all instances in which objective signs are later found, the group of patients with whom one deals in the treatment of central-nervous-system syphilis is such that one cannot rely on the questioning alone of the patient before each treatment. The mental deterioration which is present, the euphoria of the paretic, and the frequent appearance of psychoneurotic reaction pattern under prolonged medical care make a subjective examination unreliable. Also, the preservation of

TABLE 1

OCULAR COMPLICATIONS IN TRYPARSAMIDE THERAPY OF NEUROSYPHILIS.

No.	Clinic Number	Clinical Diagnosis	Previous Therapy	Preliminary Exam.			Tryparsamide discontinued after dose no:	Reasons discontinued			Subsequent course	Remarks
				Corrected Vision	Fields	Fundi		Subjective	Objective: Vision	Objective: Fields		
1	A49734	Early Paresis	Bi.	R 20/50 L 20/40	N	N	4	"Shimmering"	20/50 20/40	N	Tryparsamide discontinued	
2	A46684	Paresis	Bi.	R 20/40 L 20/40	N	N	9		20/40 20/40	Inferior portion L. E. constricted to 40°	Return to normal in one month.	
3	A46518	Tabes	Bi.	R 20/20 L 20/20	N	N	3	"Dazzling"	20/20 20/20	T 70° N 25° S 25° I 25° T 45° N 15° S 25° I 15°	Return to normal in eight weeks	
4	A46219	Paresis	Bi., Neo.	R 20/20 L 20/20	N.	N	3	"Smokiness"	20/20 20/20	N	Tryparsamide resumed later without symptoms	Anxiety state.
5	A45327	Tabo-paresis	Bi.	R 20/20 L 20/20	N	N	9	"Blurring"	20/20 20/20	I 35° T 85° N 20° S 25° I 30°	No change in field after 2 mos. Sl. pallor of disks.	Symptoms occurred after 3rd injection. Patient not seen again till after 9th.
6	A38567	Tabes	Bi.	R 20/25 L 20/25	N	N	I	Blurring	20/40 20/40	T 65° N 35° S 45° I 30° T 65° N 35° S 25° I 25°	Return to normal in two months.	
7	A37253	Tabes	Bi.	R 20/20 L 20/20	N	N	3	Blurring	20/20 20/20	T 65° I 40° T 65° I 35°	Return to normal in six weeks.	
8	A46627	Tabes	Bi.	R 20/15 L 20/15	N	N	9	"Heat waves"	20/15 20/15	N	Tryparsamide resumed after 3 weeks. No further symptoms.	
9	A36604	Tabes	Bi.	R 20/25 L 20/25	N 45° N 40°	N	3	Blurring	20/30 20/30	T 65° N 25° S 20° I 10° T 65° N 20° S 15° I 20°	Progressive constriction of fields T 45° N 15° S 10° I 10°	Slight nasal constriction on preliminary exam. was believed due to inattention.
10	A34286	Meningo-vascular.	Bi.	R 20/20 L 20/20	N	N	4	Blurring	20/20 20/20	N	Tryparsamide resumed after 3 weeks. No further symptoms.	
11	A25862	Paresis	Bi., Neo.	R 20/20 L 20/20	N	N	9	Blurring	20/25 20/25	T 60° N 30° S 25° I 30° T 55° N 25° S 20° I 20°	No change in fields or vision after I year.	No examination obtained until one month after 9th injection.
12	AI7028	Asymptom C.N.S. lues	Bi., Neo.	R 20/20 L 20/20	N	N	5	"Glare"	20/20 20/20	N	Tryparsamide discontinued	Hysterical reaction.
13	AI4368	Paresis	Bi.	R 20/20 L 20/20	N	N	4	Blurring	20/20 20/20	T 35° N 20° S 20° I 15° T 65° N 20° S 25° I 30°	Complete recovery 2 months.	
14	A43980	Early paresis	Bi., Neo.	R 20/20 L 20/20	N	N	3	"Corrugated vision"	20/20 20/20	N	Tryparsamide resumed after 3 weeks. No further symptoms.	

N = Normal T = Temporal N = Nasal S = Superior I = Inferior.

good central vision until marked constriction of the field has occurred, characteristic of tryparsamide reactions, tends to leave the somewhat retarded patient unaware of the damage. Changes of the fundus are usually not seen for three to six weeks after there has been serious impairment of the vision or field. One comes, therefore, to the examination of the visual field as the critical test in the care of these patients. Here again one encounters the difficulty of the poor coöperation to be expected from this group of patients. It is surprising however, with a little patience and with the same examiner conducting successive tests, how accurate will be the fields obtained, even in patients showing advanced deterioration.

The undertaking of a thorough examination before each injection of tryparsamide imposes a burden on examiner and patient which frequently results in discontinuance after a few such examinations. The evidence that over 95 percent of unfavorable reactions occurred before the tenth injection has led several writers to recommend examination of the eyes before each of the first ten injections, and occasional examinations thereafter. Other clinicians have felt that after preliminary examination no subsequent examination needed to be made unless subjective symptoms occurred. In dealing with our clinic patients we felt that a stand midway between these two, if the incidence of complications became no greater, would make a minimum demand compatible with safety. It was decided, arbitrarily, to make a careful examination of fields, fundi, and vision before the first, third, fifth, and tenth treatments, and before every tenth treatment thereafter. Patients received weekly injections of tryparsamide. Beginning with an initial dose of one gram, two grams was given the second week and three grams each subsequent week if no untoward symptoms appeared. The patient was questioned concerning subjective phenomena before each injection. If subjective symptoms occurred, the field and vision were checked. If the latter remained unchanged treatment was discontinued for three weeks. The finding of any objective disturbance we considered an indication for the immediate and permanent discontinuation of tryparsamide. Cady and Alvis in stating that tryparsamide may usually be resumed one month after the finding of objective signs point out that there is distinct danger in so doing, a risk which is not easy to justify.

Under the routine described above, 1,800 injections were given to 132 patients in the neurosyphilis clinic in a period of about 18 months. Ocular complications were encountered in 14 of these patients (10.6 percent). Six of them had subjective symptoms only; eight showed disturbances of the visual field, tested with a 3-mm. white object at 300 mm. In three instances only was there slight diminution in visual acuity. Permanent damage to field of vision occurred in three (2.3 percent), patients numbers 9, 5, and 11 in the accompanying table. It is most significant that in these three instances, for one reason or another, the follow-up was not enforced as outlined and in two cases the patient received nine treatments before the fields were checked.

Five other patients suffered impairment of the visual field, with complete recovery in from one to two months after cessation of tryparsamide therapy. This impairment occurred with the first injection in one patient, with the third injection in three patients, and with the

ninth in one patient. For the sake of brevity only the principal meridia of the visual fields in which changes occured are recorded in the table of complications.

The administration of tryparsamide as a syphilotherapeutic agent carries a distinct hazard, which is probably increased by the presence of preëxisting damage to the optic nerve—notably tabetic optic atrophy. This hazard can be reduced to a minimum by the adoption of a rigid routine, similar to the one here described, for the examination of the patient's fields, vision, and fundus by an ophthalmologist. In our own clinic, permanent, though not severe, damage to the visual fields occurred in three patients, damage which could almost certainly have been prevented had exception to the routine not been made by an intern who did not appreciate the hazard. However, even if an incidence of 2 percent of permanent damage to the visual fields cannot be entirely eradicated, this damage need never be disabling if proper routine examinations are made. The warning signals are plain and well in advance of disaster, if one takes the trouble to look. The proved therapeutic value of tryparsamide, in a disease which is "a medical emergency" justifies the slight risk.

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RETROBULBAR INJECTIONS OF ATROPINE IN ARTERIOSCLEROTIC ATROPHY

REPORT OF A CASE

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The paper reports the result obtained by the use of retrobulbar injections of atropine in a case of arteriosclerotic atrophy. From the Division of Ophthalmology, University of California Medical School. Read before Pacific Coast Oto-Ophthalmological Society, Del Monte, California, April 1, 1936.

In 1924, Abadie[1] reported a case of optic atrophy in which retrobulbar injections of atropine restored vision. Springovitsch,[2] in 1933, published his results with the use of this procedure in 51 eyes that showed varying degrees of optic atrophy. Of this group, 96 percent showed definite improvement, although the amount varied considerably. In one instance, the vision improved from light perception to 1.0. The prognosis was best in cases in which vision had not dropped below 10/200; in five, the sight was restored to normal.

The etiology of the atrophy had no apparent influence, for cases of optic atrophy as a result of unknown etiology, methyl-alcohol intoxication, brain tumors, trauma, and syphilis were treated.

During the time of observation, which extended as long as 16 months after treatment, only seven of the 51 eyes showed retrogression. In these cases, repetition of the procedure was again beneficial.

Peripheral-field contractions and central scotomata were materially improved. The increase was noted in most instances shortly after the first treatment. The injections were well tolerated, even by 11- to 12-year-old children and in general caused no complications, although a few patients showed swelling of the upper lid and complained of headache and dryness of the throat.

In 1935, Springovitsch[3] reported that he had used this treatment in a total of 88 cases, with failure in only five instances. The remainder all showed improvement, even where only light perception was present.

Recently, Pillat[4] of Vienna has employed this drug in the treatment of the optic atrophy of tabes, vascular disease, and retrobulbar neutritis. In his opinion, the arteriosclerotic type offers by far the best prognosis.

The procedure consists of the retrobulbar injection of 0.5 (1/120 gr.) to 1.0 c.c. (1/60 gr.) of a 1:1000 solution of atropine twice a week for 10 to 15 injections, the dosage being determined by the patient's reaction. The method is that usually employed in retrobulbar anesthesia.

Aside from the needle prick of the skin, no pain is associated with the administration of the drug, provided one does not strike the orbital periosteum. Within five to 10 minutes after the injection, there is a slight swelling and redness of the lower lid that subsides in a short time. The reaction observed by the patient is that of a general dryness which, at first, is present for only one day after the injection, but later persists throughout the course of treatment. This is accompanied by loss of appetite and some sleeplessness.

Pillat attributes the beneficial effects primarily to prolonged vasodilatation of the retinal vessels and vessels of the

optic nerve caused either by a direct action of the drug or irritation induced by its use. The improvement is a gradual one that begins within a few days after the first injection.

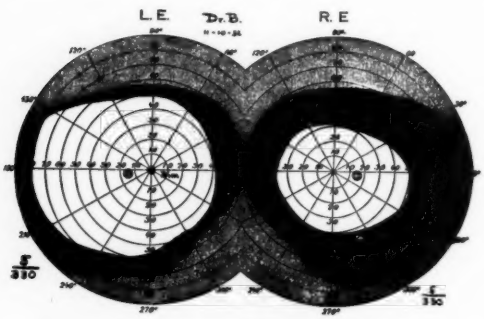

Fig. 1 (Cordes). Visual fields on November 10, 1932, showing a concentric contraction in the right eye and a relative scotoma in the left.

The following case in which treatment was by this method is of sufficient interest to warrant its presentation.

CASE REPORT

Dr. B., aged 70 years, was first seen on November 10, 1932, complaining of loss of central vision in his left eye. The

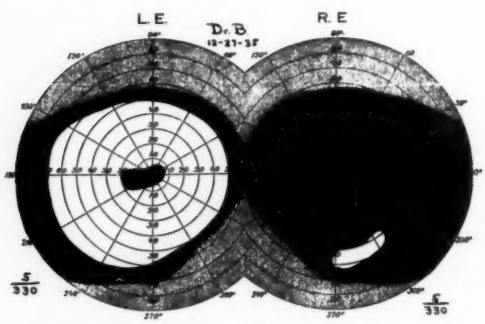

Fig. 2 (Cordes). Visual fields on December 13, 1934, showing the result of a gradual progression of changes.

right was amblyopic due to a marked astigmatic refractive error. The vision of the left eye, with correction, was 0.2. Examination showed rather marked arteriosclerosis with some fine central arteriosclerotic changes in the left eye. The perimeter and screen revealed a concentric contraction in the right eye and a relative scotoma in the left (fig. 1). Aside from this, the examination was negative. Observation over a period of time seemed to indicate that the process was stationary, so that telescopic spectacles were ordered and with these, he was again able to read.

On December 13, 1934, the patient returned, complaining that he was no longer able to read. A dense central scotoma was present in the left eye with some peripheral contraction of the

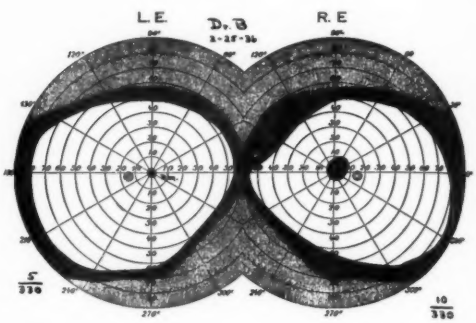

Fig. 3 (Cordes). Visual fields on March 10, 1936, improved after a course of 10 retrobulbar injections of atropine in each eye.

fields of both eyes. The discs showed beginning arteriosclerotic atrophy. The field changes gradually progressed until, in the right eye, there remained only a temporal crescent, while the left showed a marked peripheral contraction in addition to a large central scotoma. This reduced the patient's vision to such an extent that he had great difficulty in getting about (fig. 2).

At this time, he was told of the possibility of trying retrobulbar injections of atropine. These were started in the left eye on December 27, 1935.

Since the patient did not reside in San Francisco, he was told to report in one week after the first injection. At

this time he stated that for the first three days following the treatment there had been a marked improvement in his vision. The injections were then given twice a week until 10 had been given in each eye. Within two weeks of the first treatment there was a decided improvement in the field and the scotoma was less dense. At the time of the last examination, the fields were markedly improved in each eye and the scotoma of the left eye was smaller and a relative one, so that the patient was again able to read with the aid of his telescopic spectacles (fig 3). The vision of the left eye at the date of the last examination, March 10, 1936, was 0.2 with correction.

While the results in one case do not warrant any definite conclusions, the treatment outlined does seem to offer possible aid in arteriosclerotic changes of the eye. It is hoped that this case report may result in the use of this therapeutic measure in these otherwise hopeless cases so that more definite conclusions can be formed regarding its efficacy in this and other types of atrophy.

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[4] Pillat. Personal communication.

RETINAL ANGIOSPASM IN TOXEMIA OF PREGNANCY AND HYPERTENSION

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Retinal angiospasm is an almost constant accompaniment of toxemia of pregnancy. When marked spastic changes occur early in the pregnancy they indicate the presence of a severe toxemic process which, unless the toxemia is controlled or pregnancy terminated, endangers the viability of the child and results in the future impairment of the mother's health.

Spastic changes form part of the mechanism of systemic arterial hypertension. The mechanism of arterial hypertension and the importance of differentiating functional from organic vascular changes are discussed. Eyeground changes encountered in nephritis are a result of hypertension. From the Department of Ophthalmology, Rush Medical College, University of Chicago. Read before the Chicago Ophthalmological Society, May 25, 1936.

Spasms of the retinal arteries may be intermittent or continuous; that is, clonic or tonic. The intermittent form may last from a fraction of a second to several minutes or longer and may be constantly repeated or may be seen at irregular intervals. They may affect only a certain small segment of the artery or may travel, wavelike, over a large part or even entire branches of the central artery. The continuous or tonic spasm may last from several minutes to several days or weeks and may also involve a small part or an entire branch of the central artery. All the arterial branches from the primary division of the central artery to the smallest visible precapillaries may be affected.

The intensity of the spasm may vary from a slight indentation of the vessel to complete obliteration of the involved branch. Probably the commonest form is the one of moderate intensity which results in noticeable inequality in caliber of the arteries. The highest grades of angiospasm may be easily recognized in the inverted image by indirect ophthalmoscopy, while those less intense require prolonged and systematic examination of all arterial branches, from the largest to the smallest visible in the upright image of direct ophthalmoscopy. It is only when a systematic search for these abnormalities is made that one can be sure of finding them. When the habit of searching for these changes in caliber has been developed they can be found with surprising frequency, similar to the frequency with which retinal tears are now found in detachment of the retina when formerly they seemed to be a rarity.

It is important, in the examination for angiospasm, to use a good grade of electric ophthalmoscope. Differentiation of true spastic variations in caliber must be made from shifting vessel reflexes and variations in caliber of vessels as a result of obliquity in their course, or obscuration of part of a vessel by exudates. Arterial pulsations also should not be mistaken for vessel spasms. Arteriosclerotic thickening of the vessel walls with consequent narrowing of the lumen may be mistaken for a spastic variation in caliber. The differentiation of these two conditions may be quite difficult at times. Prolonged spastic states of the arteries associated with high blood pressure lead to sclerotic changes in the vessel walls. It is known that the variations in caliber of sclerotic arteries are largely a result of organic changes (thickening) of the vessel walls, but that there is also a lesser spastic component. This is shown in vascular deficiency diseases of the foot in which the functional or

spastic component can be eliminated by anesthetizing the posterior tibial nerve. In purely functional disturbances, as in Raynaud's disease, there is a marked rise in skin temperature and a noticeable color change after this procedure, while in arteriosclerotic deficiency these changes are slight but nevertheless still present, unless the sclerosis is unusually marked.

Vascular spasms may be an indication of the action of an irritating toxic substance on the vasomotor system and thus may be on the basis of a systemic disorder as seen in toxemias of pregnancy, in essential hypertension, nephritis, and other conditions. In those cases they are usually bilateral. They may also be the result of local action of toxic substances directly on the musculature of the arteries, as is observed in purely local disorders of the eye. In this case they may be unilateral.

In this series of cases the eyegrounds were examined under homatropine or euphthalmine mydriasis and whenever possible the findings were checked with the Gullstrand ophthalmoscope. When this was not possible the observations were made on the medium-sized (the size of the macular or larger branches) or larger arterial branches except when the narrowing of the small branches resulted in unmistakable total obliteration of the vessel lumen. The presence of the intermittent contractions is of great help in making the diagnosis of angiospasms, and a special effort was made to find them whenever possible.

TOXEMIA OF PREGNANCY

Of 19 patients with symptoms of toxemia of pregnancy on the services of Drs. William A. Thomas, C. P. Bower, and E. D. Allen at the Presbyterian Hospital, all but one showed an intermittent or continuous spasm of the smaller, medium-sized, or larger branches of the retinal artery. The intermittent spasm was by far the most common, being present in 17 out of 19 cases. The tonic spasm manifested itself by a persistent irregularity in the caliber of the vessel. Slight blurring of the disc margins was present in 5 cases with more severe symptoms of toxemia, while exudates and hemorrhages into the retina were observed in 3 patients with preëclamptic symptoms. The blood pressure ranged from 150/84 to 230/146, the average being 167/98. One patient had definite spastic changes of the retinal vessels and other symptoms of toxemia of pregnancy with a blood pressure of 126/72 but there was a complicating cardiac decompensation to account for the low blood pressure. Another patient who had mitral stenosis but was compensated had a blood pressure of 160/80. One patient with a blood pressure of 162/89 and mild toxemic symptoms showed no evidences of retinal angiospasm at the time of examination. Repeated eyeground examinations might have revealed such changes at some stage of the toxemia.

As pointed out by Heynemann,[1] Mylius,[2] Wagener,[3] and others these functional changes in the retina and retinal arteries are an almost constant accompaniment of toxemia of pregnancy and, if very marked, may indicate severe kidney and other damage. If they occur before the 28th week of pregnancy they lead almost invariably to permanent cardiovascular-renal disease in the mother. As pointed out again recently by Hallum,[4] only 25 percent of living babies are born when the toxemia develops at this early stage. Its presence is an indication for termination of pregnancy and, as emphasized by Wagener,[3] if the eyeground changes go on to sclerotic vascular changes, is a contra-

indication to future pregnancies. When spastic changes occur late in pregnancy the prognosis is not so grave.

ESSENTIAL HYPERTENSION

Of 30 patients with essential hypertension all had an inequality in caliber of the retinal arteries. Of these 22 had, in addition to the tonic spasm, an intermittent spasm of one or several medium-sized to larger branches of the central artery. Practically all had a varying degree of retinal arteriosclerosis. The arterial blood pressure varied from 160/100 to 280/150, the average being 195/108. The ages of the patients varied from 20 to 72 years, the average being 48 years. One 59-year-old patient with a blood pressure of 280/150 had a bilateral papilledema of 2 diopters and flame-shaped retinal hemorrhages, while another patient, a woman 34 years of age with a blood pressure of 250/160, also had a moderate edema of the nerve head with retinal hemorrhages and grayish exudates in the posterior polar region. This latter patient had a bilateral splanchnic nerve resection for the hypertension but with negative results. These two patients together with three others in this series belong to the group of cases of hypertension referred to by some authors as malignant hypertension. The eye-ground changes in this group consist of edema of the retina with cotton-wool exudates, swelling of the nerve head, and retinal hemorrhages in addition to the spastic and sclerotic retinal vascular changes. The mortality rate is about 85 percent over a three-year period as contrasted with a mortality rate of 20 to 50 percent in the so-called benign form of essential hypertension.

An understanding of the relation of spastic arteriolar changes to hypertensive disease is of the greatest importance. Sclerosis of the large arteries, such as the radials, iliacs, and others, does not cause hypertension. Our present-day concept of the pathogenesis of arterial hypertension is as follows: The irritative action of some unknown toxic substance or metabolic product on the vasomotor center in the medulla or directly on the vasomotor nerves results in a spastic contraction of the arterioles and small arteries of the body. This brings about a narrowing of the lumina of the vessels and after some time leads to a hypertrophy of the medial arterial and arteriolar coats. The increased peripheral resistance forces the heart to work harder in order to pump the blood through the vascular tree. Hypertension has thus come about. As long as the disease has not gone beyond this stage the process is reversible, and a return of the blood pressure to normal can safely be accomplished. If, however, the hypertension persists for a long time or the noxious agent is very toxic, fibrotic and sclerotic changes develop in the hypertrophied medial coat and even thrombotic and endarteritic changes are found, as shown by Keith, Barker and Kernohan.[5] The disease has then reached an irreversible stage designated "malignant" hypertension by some writers. Actually it is the end stage to which the so-called "benign" hypertension leads if left uncontrolled. When sclerotic changes have developed, therapeutic measures are not only of no avail but a drastic reduction of blood pressure is actually dangerous since an insufficient amount of blood reaches the vital organs and thus leads to anemia of the brain, heart, kidneys, and other organs.

From this it can readily be seen how important it is to determine whether the arterial hypertension has reached the stage of fibrosis or sclerosis of the small arterial branches or whether the process is still reversible. This is of spe-

cial importance now that surgical procedures on the vasomotor nerves are in vogue. The ophthalmologist can observe the type of vessels in which these significant changes occur. He can study them under a magnification of 16 times their normal size with the ophthalmoscope, or more than twice that magnification with the Gullstrand binocular ophthalmoscope. To judge by the mechanism of hypertension it would appear that the presence of intermittent spasms would be a great help in differentiating functional from true organic changes in the small arterial branches and thus would be of great prognostic importance.

RENAL NEURORETINOPATHY

Our conception of renal neuroretinopathy has undergone a change. We know that albuminous transudates, hemorrhages and swelling of the nerve head are frequently found in advanced stages of arterial hypertension and that the hypertension encountered in nephritis is probably a result of arteriolar changes brought about by the same toxins which cause the nephritis. The vascular changes in turn are responsible for further kidney damage. Extensive vascular changes of "malignant" hypertension are accompanied by severe kidney damage with albuminuria and eyeground changes identical with those described as "albuminuric neuroretinitis." Acute and chronic nephritis can exist with normal arterial tension and normal eyegrounds. The retinal changes ascribed to the nephritis are not infrequently a result of the accompanying hypertension.

Spastic arterial changes can be accounted for just as easily on the basis of the hypertension as on that of the nephritis.

In five cases of glomerulonephritis in young individuals—the youngest 11 years of age, the oldest 27—all of whom had a hypertension with an average blood pressure of 160/90, spastic arterial changes without exudates or hemorrhages were observed. Albuminuric changes may develop later as the sclerotic arteriolar changes progress.

SUMMARY AND CONCLUSIONS

Spasms of the retinal arteries may be intermittent or continuous. The presence of intermittent spasms facilitates the diagnosis and makes it more certain. Only a segment of an artery or several large branches may be affected. They are an almost constant accompaniment of toxemia of pregnancy and, together with other retinal changes are of great prognostic importance. The ophthalmologist has an opportunity to study, under great magnification, the type of vessel concerned in hypertension. A study of these vessels will help in differentiating the form of hypertension amenable to treatment from that in which treatment is hopeless.

Eyeground changes in nephritis are largely the result of arteriolar disease rather than the nephritis per se.

55 E. Washington Street.

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NOTES, CASES, INSTRUMENTS

A SECOND OPHTHALMOLOGICAL SURVEY OF THE ILLINOIS STATE SCHOOL FOR THE BLIND

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FIRST SURVEY

In April, 1933, a survey was made of all of the children in residence at the Jacksonville School, at the request of the Board of Public Welfare of the State of Illinois.[1] A total number of 238 children was examined, their visual acuity measured, and the history on file at the school noted. In each instance it was determined whether the child should be in a blind class, sight-saving class, or regular school. Special attention was given to the possibility of improving their vision by medical or surgical treatment. It was found that:

The number of children with vision in the better eye of 20/70 or better was 18 or 7.5 percent.

The number of children with vision in the better eye of between 20/70 and 20/200 was 41 or 17.2 percent.

The number of children with vision in the better eye of less than 20/200 was 179 or 75.3 percent.

From this it can be seen that 59 children or 24.7 percent were receiving instruction by blind methods when they really belonged in sighted classes. In addition, 64 children or 26.9 percent offered some possibility of having their vision improved by appropriate treatment.

SECOND SURVEY

A second survey was made in the same manner in October, 1935. At this time there were 224 children in residence.

The number of children with vision in the better eye of 20/70 or better was 7 or 3.1 percent.

The number of children with vision in the better eye of between 20/70 and 20/200 was 39 or 17.4 percent.

The number of children with vision in the better eye of less than 20/200 was 178 or 79.4 percent.

All of the children with vision of 20/200 or better were receiving sight-saving-class instruction.

The appended tables A, B, and C give the details of the differences found in the two surveys. The most striking differences are: 1. The number of patients with vision of 20/70 or better was reduced from 18 to 7. 2. The number of cases of optic atrophy increased from 32 to 63. 3. The number of cases of glaucoma increased from 17 to 35. 4. The number of cases of operable cataract increased from 7 to 15. 5. The number of cases of retinal detachment increased from 0 to 6. 6. The number of cases of trachoma was only 4.

About the same number of surgical operations was advised in each survey, and in only a few instances had operations recommended in the first survey actually been done. It is quite obvious that this situation needs to be remedied, both for the welfare of the children and in fairness to the taxpayers of the state. After a child is in the school it is quite difficult to get the parents to consent to an operation. Of course, a policy might be adopted of discharging any child if the parents declined to permit a recommended operation to be done, but such a policy would cause considerable friction and resentment. The same objective would be reached within a few years if the institution declined to admit any child who might be benefited by surgical treatment until such treatment had been tried.

58 East Washington Street.

[1] An ophthalmological survey of Illinois State School for the Blind. American Journal of Ophthalmology, 1934, v. 17, July, pp. 624-626.

TABLE A

CLASSIFICATION ACCORDING TO VISION

	1935	1933
Both eyes totally blind	50	49
One eye totally blind	51	43
Best eye has light perception	55	45
Best eye discriminates shadows	9	15
Best eye counts fingers	8	23
Best eye 1/200 to 20/200	56	47
Best eye 20/200 to 20/70	39	41
Best eye 20/70 to 20/30	6	13
Best eye 20/30 or better	1	5

TABLE B

CLASSIFICATION ACCORDING TO DISEASE

	1935	1933
Staphyloma	16	10
Optic atrophy		
Meningitis	14	2
Hereditary	2	1
Undetermined	29	29
Oxycephaly	2	0
Head injury	10	0
Brain tumor	6	0
Accidents		
Perforating injuries	7	10
Sympathetic ophthalmia	13	9
Glaucoma		
Primary	22	3
Secondary	13	14
Cataracts operable but not operated on	15	7
Cataract	54	34
Cataract with microphthalmos	6	11
Ectopia lentis	10	0
Microphthalmos	8	9
Macular coloboma	7	0
Choroiditis	13	6
Iritis	2	0
Corneal opacity	38	21
Interstitial keratitis	6	8
Phthisis bulbi	37	14
Enucleated both eyeballs	8	10
Cerebral blindness	2	3
Retinitis pigmentosa	8	7
Conical cornea	3	2
Retinitis proliferans and vitreous hemorrhage	2	2
Retinal detachment	6	0
Retinal degeneration	6	8
Xerosis of cornea	2	1
Definitely due to ophthalmia neonatorum	22	27
Kerato-iritis	2	0
Myopia	15	12
Hyperopia	8	5
Albinism	16	5
Trachoma	4	2
Aniridia	4	2
Cryptophthalmos	1	0
Metastatic endophthalmitis	14	0
Anophthalmos	1	0
Retinoblastoma, bilateral	1	0
Congenital nystagmus	2	0
Totals	457	274

The discrepancy between the number of diagnoses and the number of patients is accounted for by the fact that in many instances there was more than one pathological condition present.

TABLE C

SUMMARY OF TREATMENT ADVISED

	1935	1933
Trephining	1	3
Iridectomy	15	14
Iridectomy and lens extraction	4	4
Lens extraction	4	0
Enucleation	4	4
Capsulotomy	0	1
Needling	31	34
Iridotomy	1	1
Diathermy peritomy	0	1
Chalazion removal	0	1
Stripping cornea and graft	2	1
Iridencleisis	4	0
Excision of staphyloma	2	0
Corneal transplant	2	0
Evisceration	1	0
	71	64
Refraction	40	69
Telescopic lenses	7	11
Contact glass	0	1
	47	81

PANOPHTHALMITIS FROM AN ENCAPSULATED ORBITAL ABSCESS

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On May 1, 1936, J. L., aged 60 years, came to the office complaining of pain and inflammation of the right eye. He stated that 17 years ago the eye had been injured by a piece of metal. This resulted in partial loss of vision for a period of five years. An ulcer then developed, following which vision was lost and the patient noticed that this eye remained much more prominent than the left eye. Over a period of years the swelling increased, but there was no pain, and he could not open the lids. A week prior to May 1st, he noticed pain, with inflammation and discharge.

On examination, the lids were slightly edematous, with complete ptosis of

the upper lid, which was greatly stretched, measuring 2¾ inches across. The orbit was filled with a mass, the size of a small peach, the whole being barely covered with the hand. On raising the upper lid, only a mass of deeply engorged conjunctiva could be seen. Where the cornea should have been were two small abscesses. The doughy consistency, lack of severe pain, and history made the diagnosis uncertain.

An evisceration was decided upon and an incision was made into one of

Fig. 1 (Glover). Panophthalmitis from an encapsulated orbital abscess.

the small abscesses, following which pus shot nearly two feet into the air. The lens was present but the vitreous was a mass of pus. A wet dressing was applied and the patient sent back to bed. On the next day, he stated there was no pain whatever. Wet dressings were continued and the eye watched for a week During this period, the swelling subsided by about a third, but pus continued to drain from the globe, which was unusual, for no cause could be found, the eviscerated globe being apparently clean. The photograph shows the marked enlargement still present at the end of a week.

As the leucocyte count was 12,000 and no elevation of temperature was present beyond half a degree at any time, it was deemed advisable to remove the globe. This was easily dissected until the temporal side was reached, when on attempting to sever the external rectus a mass the size of a hickory nut could be palpated with the scissors. While dissecting this mass pus gushed forth and further dissection proved it to be an encapsulated orbital abscess with walls fully an eighth of an inch thick, closely adherent to the globe and to the fascia on the temporal side. This was removed with the globe. The conjunctiva was sutured and a pressure dressing applied.

The wound healed cleanly at once, with all edema gone in a period of two weeks. The upper lid has shrunken considerably, but complete ptosis is still present, with the skin wrinkling in folds.

Examination of the globe and mass showed a small fistulous tract through the sclera into and through the encapsulating wall. From the history, it would be judged that an orbital abscess had occurred 13 years ago, which had not been evacuated and had become walled off. Some irritant probably stirred up the infection, finally causing a perforation into the globe. Examination of the pus revealed staphylococcus albus. Pus draining through the fistula into the eviscerated globe had greatly reduced the size of the abscess at the time of enucleation.

The long duration, absence of severe pain, low leucocyte count, and lack of fever show how well an immunity can be built up to this type of infection. It made the diagnosis difficult, especially as an inflammatory tumor mass had to be considered.

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HYPERTHERMIC TREATMENT FOR ACUTE GONORRHEAL OPHTHALMIA

THREE CASE REPORTS

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In perusing the literature no mention of the use of hyperthermic treatment in cases of acute gonorrheal ophthalmia has been found.

As a result of this grave infection of the conjunctiva it has been the experience of almost every ophthalmologist to see the majority of his patients suffer more or less loss of vision. The writer has come to regard some reduced vision as a routine experience, and in common with the average ophthalmologist views with dread and apprehension the acute gonococcus infection of the conjunctival sac. Two of the three patients in the cases herein reported were at the same time suffering from urethral infections, the infection undoubtedly having been carried to the eye through carelessness on the part of the patient. In the third case there was neither gonorrheal urethritis nor vaginitis, and the source of the eye infection was not known to the physicians in attendance, in as much as no member of the patient's household had a venereal disease.

Case 1. M. R., a Filipino male, 25 years of age, gave the history that for several weeks he had a urethral discharge and on the day before admission to the hospital had noticed some redness of the right eye, which soon became very painful with lacrimation and swelling. By the evening of that day the lids were enormously swollen and some purulent discharge was present. On the day of admission to the hospital the left eye also became inflamed and the lids swollen with a considerable amount of purulent discharge present. A smear made of the discharge from both eyes revealed intracellular gram-negative diplococci, which were identified as the gonococci of Neisser. The patient was immediately placed upon the régime of frequent irrigations and cleansing, with applications of 2-percent silver-nitrate solution to the conjunctiva. Eight cubic centimeters of whole milk, boiled three minutes, was given intramuscularly on the day of admission to the hospital and repeated daily for five days.

At 7:15 A.M. on his third hospital day, the patient was placed in a heat cabinet, his temperature before the treatment being 100.2°. By 1:15 P.M. his temperature reached 107.8° and was maintained between this point and 106° until 5:45 P.M. During his first day in the heat cabinet the patient consumed one quart of water and saline solution.

Examination of the patient's eyes on this day revealed steamy corneae, also a tiny defect in the epithelium of the right cornea. Both upper and lower lids were intensely swollen and chemotic. There was a profuse discharge from both eyes which required cleansing with boric solution every 15 minutes. That evening after the hyperpyrexia treatment, and during the following day the nurses in attendance noted a very spectacular reduction in the amount of purulent discharge from the eyes.

On the evening of the day after the first hyperthermic treatment the patient complained bitterly of pain in his right knee and elbow. The next day (two days after the first heat treatment) the patient was again placed in the heat cabinet at 7:30 A.M. and the temperature rapidly elevated to 108° in two hours and then reduced to 107°, this temperature being maintained until 6:00 P.M. The patient consumed 3,000 c.c. of fluid during that day. Examina-

tion of the right eye revealed a well-marked ulcer of the cornea. Very little discharge was noted from either eye and a smear showed pus cells, but no organisms of any type were found. Repeated examinations of the discharge from the eye were made from the day of his admission until his discharge, approximately 42 days later, but only the first three examinations were positive, all the rest being entirely negative for all organisms.

On the 10th hospital day at 7:15 A.M. the patient was again given a hyperpyrexia treatment which was discontinued at 6:00 P.M., his temperature for the greater portion of the time while in the cabinet being around 106.5°. The frequency of the cleansing treatments to the eye had been rapidly diminished, there being little need for treatment, except for attention to the ulcer, so marked was the reduction in the amount of purulent discharge. The last treatment in the heat cabinet was on the 34th hospital day, the patient having had eight such treatments in all. With the exception of the first two treatments which had so materially influenced the ocular condition, the remaining six were given in the hope that they would expedite the cure of the urethral condition and alleviate the severe symptoms of pain and swelling in his arm, knee, and chest articulations.

Throughout his stay in the hospital this patient's temperature ranged from 98.6° to 103°, except during the periods of hyperpyrexia treatments. Numerous temperature readings were taken beneath the upper and lower lid during the height of the fevers. It was found that the temperature beneath the upper and lower lids was approximately one-half degree higher in the upper cul-de-sac than in the lower cul-de-sac, and the temperature of the lids was on the average two degrees less than the body temperature.

This patient was discharged from the hospital with 20 percent loss of vision in the right eye.

Case 2. Mrs. D. E., 18 years old, a Porto Rican, was admitted to the hospital with the history that four days prior to admission, while playing with a pet cat, her left eye had been struck by the cat's paw. There was immediate pain and the following day the patient noted a purulent discharge. This discharge increased in quantity, the eye became increasingly painful, and there was marked edema and chemosis of the upper and lower lids. Immediately on admission to the hospital a smear and culture were taken from the secretions of the left eye, and were found to contain many gram-negative intracellular diplococci. The patient was immediately placed on appropriate routine treatment for such conditions, and given nonspecific protein (whole milk) intramuscularly. The eye which appeared to be unaffected was protected by a Buller's shield and approximately 24 hours after her admission the patient was placed in the heat cabinet for hyperthermic treatment. The temperature in two hours reached 107° which temperature was maintained for five hours, the patient being removed from the heat cabinet after an approximate period of eight hours. During the hyperthermic treatment the patient received 3,500 c.c. of fluid. The evening following the heat treatment there was a profuse, thin, purulent discharge from the left eye, which again, upon examination, showed the gram-negative intracellular diplococci. On the following day another smear taken was negative, and at no time after the first negative specimen did any gram-negative organ-

isms appear again in smears taken from this patient. Repeated smears of the vaginal and urethral tract showed no trace of the organism, nor could any gonococcus organism be found on any member of the family. The source of this infection is unknown. At any rate, it was not her own organism, which may have had some bearing on its virulence in this particular patient.

Case 3. B. P., a Filipino male, aged 27 years, was admitted to the hospital with the history of acute, painful swelling of the left eye for three days prior to admission, and a urethral discharge for the past three months. Smears of both eye and urethral secretions on examination proved to be positive for the gonococcus organism, and the right eye which had appeared normal and without infection on admission was immediately protected with a Buller's shield, but in spite of this precaution, within 24 hours the right eye appeared infected.

Examination of the left eye, on the evening of admission, showed it to be much swollen, edematous, and the skin tense, with pus rolling out of the palpebral fissure. The upper conjunctiva was hemorrhagic and extended down over the cornea, which appeared cloudy and presented one "ground glass" area in its lower third. This cloudy area rapidly broke down into a deep ulcer which progressed in spite of active treatment, finally requiring two cauterizations with chemical cautery to the undermined edges.

In two weeks the ulcer finally healed without perforation and the area of the corneal opacity occupied the lower third with some slight reduction in vision. The right eye completely escaped corneal damage.

The patient was placed in the heat cabinet at 7:00 A.M. on the morning following admission to the hospital. At this time his temperature was 99°. The heat was turned off at 3:30 P.M., the patient's temperature having risen from 99° to 107.5° in two hours. He was kept at this temperature until 3:30 P.M., when he was allowed to cool off gradually and was removed from the heat cabinet at 5:00 P.M. He received 4,300 c.c. of fluid during his treatment in the cabinet, but was quite restless and irrational during part of the day. His blood pressure dropped from 130/80 to 90/50.

Marked reduction in the amount of discharge from the eyes was noted immediately. His second heat treatment was given two days later, beginning with a temperature of 99° at 7:00 A.M. and in approximately two hours reaching 107°, being maintained at this elevation for two-and-a-half hours. At this time the patient became very irrational and violent. The heat was turned off and he was removed from the box approximately four hours later with a temperature of 103°. He was very violent all night but by the following day began to improve mentally and was dismissed from the hospital 37 days after admission, with no discharge from either eye and a good general result.

The astounding fact in this case also is that immediately following the first hyperthermic treatment there was a marked reduction in the amount of discharge.

Alexander Young Building.

SOCIETY PROCEEDINGS

Edited by Dr. H. Rommel Hildreth

MINNESOTA ACADEMY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY

SECTION ON OPHTHALMOLOGY

March 13, 1936

Dr. George E. McGeary, *presiding*

CATARACT ASSOCIATED WITH ECZEMA

Dr. A. G. Athens, Duluth, read a paper on this subject and presented a case of progressive bilateral, anterior and posterior polar cataract, which had developed in a man 37 years of age. The opacities occurred as small flat discs beneath the anterior and posterior capsules. The patient had suffered from a severe, seasonal skin rash about the face and other parts of the body for five years previous to the onset of defective vision. This occurred only in the summer and early fall and had been diagnosed by several dermatologists as "contact dermatitis." It was thought to be due to pollens, although the skin tests to pollens of his locality were not conclusive. Three months before his vision began to fail, the patient received, at the hands of a dermatologist, a total of three "skin-unit" doses of X rays to the face over a period of three weeks. The eyes were shielded with protective lead glasses during the treatment.

Discussion. Dr W. L. Benedict, Rochester, said he was very glad to hear Dr. Athens's report of cataract associated with allergy, but he feared Dr. Athens, in his discussion, had confused the question somewhat by bringing in the factor of radiation. He expressed no doubt of the effect of X ray and radiation on lenses. Cataracts produced by radiation are quite similar to cataracts seen in young persons with tetany or eczema or from the effect of dinitrophenol; while in Dr. Athens's case the eczema was limited to the face and cataracts came on after radiation. Dr. Benedict said he had careful records of nine cases of cataract in patients having allergy who had not been subjected to radiation. Furthermore, in his cases the dermatitis usually was extensive over the body and its allergic character proved. In consideration of the relation between cataract and neurodermatitis, the likelihood of extraneous factors must be eliminated. Slitlamp examination of the lenses of young people having neurodermatitis will frequently reveal small opacities beneath the capsule, oftener at the poles but with uniform cloudiness quickly developing. At later stages the lenses appear as hypermature, gray, soft, degenerated cataracts. They can be easily removed by linear extraction. The changes in persons having neurodermatitis are fairly rapidly progressive, leading to complete, gray homogeneous cataracts without other evidence of deterioration in the eye. Slitlamp examination of all patients who have neurodermatitis was advised. Dr. Benedict had no doubt that cataracts occur in comparatively young allergic persons in whom dermatitis may later become arrested.

Dr. Athens wished to thank Dr. Benedict for his discussion. He said he had carefully avoided drawing any definite conclusions in this case because he admitted the etiology was unknown.

The fact that the patient had had the dermatitis for some five years before his vision began to blur seemed to Dr. Athens to indicate that some more recent factor was involved in the production of the cataract. The patient had had his radiation only a few months before. It is admitted that in most of the cases in the literature in which cataract developed from X-ray therapy large doses were received. However, Rohrschneider had three patients who received single doses of 60 to 75 percent of the skin erythema dose which would be less than this patient received. Dr. Athens said he believed there may be many factors that enter into cases of this sort. This man had a blood sugar of 190 mgm. on one occasion, if the test was correct. A high blood sugar and possibly also deficient vitamins or disturbed endocrines may play a part in the etiology of these cases.

W. E. Camp,
Secretary.

CHICAGO OPHTHALMOLOGICAL SOCIETY

March 16, 1936

Dr. Robert Blue, *president*

APPARENT INCREASES IN HYPEROPIA UP TO THE AGE OF NINE YEARS

Dr. E. V. L. Brown read a paper on this subject which was published in this Journal (December, 1936).

FAILURES AND SUCCESSES IN THE OPERATIVE TREATMENT OF DETACHMENT OF THE RETINA

Dr. Thomas D. Allen read a paper on this subject which was published in this Journal (November, 1936).

Discussion. Dr. E. V. L. Brown agreed that one should search for foci of infection and that rest in bed helps in rare cases, but patients should be operated on promptly because results are definitely better when operation is performed in the first three months. It is obvious that in most cases we do not know why we succeed or fail. He felt that when redetachment occurs patients should be operated upon again and again. One young woman had a detachment after a cataract operation. Three operations were without success, but following the fourth operation the retina has now been in place 11 months.

Dr. W. F. Moncreiff said that the matter of the physical state of the vitreous as a factor in the production of retinal tears followed by retinal detachment, should receive some mention here. While the clinical examination of the vitreous from this standpoint, which has been well described by Lindner and others, is beset with marked technical difficulties, further studies may lead to methods of coping more satisfactorily with this phase of the problem. Thus the incidence of recurrence may be further reduced.

Dr. D. C. Orcutt said that the first time he performed this operation, in 1908, not knowing anything about tears he trephined the sclera. The result was perfect reattachment and normal vision. The patient was under observation until her death only two or three years ago. The next case was some time afterward, about 1910, and the same procedure was followed by the same result. Shortly afterward he had a case of aphakia following extraction about eight years before; he repeated the same procedure with same result. He knew nothing about tears then, but shortly afterward began to look for them. After following the methods of Gonin and Walker and others, finding tears and closing tears, he still looked back at the results in his first three cases as some-

thing a little short of miraculous, because he had not had such results since.

Dr. Harry Woodruff remarked that this discussion about retinal tears brought to mind a case he had had many years ago. A man with but one eye, who had lost the first eye from foreign-body injury, then had the second eye injured with a large piece of steel weighing five grains. It entered the eyeball posterior to the ciliary body. The steel was removed a few hours after the injury. Normal vision was retained for two weeks, then detachment appeared. At that time operation for retinal detachment with a double-edged knife was advocated by Deutschmann, and he worked on the theory that the retina must be punctured with a knife. He made puncture and counterpuncture, passing through the retina in two places.

With Dr. Dodd's help, this patient was operated on 12 times and finally the retina remained in place. Furthermore, this man worked at his trade for 20 years afterward as a structural iron worker. Then he met with a minor injury to the hand and the poor vision was discovered incidentally by the surgeon and he could not work any more; but he still retained vision.

Dr. Thomas D. Allen was much pleased to hear of Dr. Woodruff's case. He had operated at most five times on one patient, but would continue trying repeatedly after this.

SURGICAL TREATMENT OF RETINAL DETACHMENT

Dr. Sanford Gifford read a paper on this subject which will be published in the Archives of Ophthalmology.

Discussion. Dr. Louis Bothman asked about choroidal detachment following operation. This complication was not found, probably because the eyes were not examined nor the dressings changed for five to seven days after operation. We know that choroidal detachments are frequent after many intraocular operations. O'Brien has recently reported on the frequency of choroidal detachment after cataract operation. Dr. Blue asked about the muscles. Frequently it is necessary to detach a muscle and then reattach it, and only occasionally is there trouble from diplopia or some muscle anomaly following such operations. More recently, with the Gradle instrument, it has not been necessary to detach the muscles so often, as it is possible to reach around the muscle and get in behind more easily.

Dr. Sanford Gifford said, with reference to rest in bed, that this is important when there is a large amount of fluid under the retina. So far as the retina returning to place is concerned, if this does not occur within two or three days it will not go back. Cases of spontaneous reattachment are rare, and nearly always the detachment recurs when the patient gets up. It is well to get the retina as flat as possible before operating.

It is a mistake to operate too soon the second time. That is when acute hypotony occurs. Dr. Gifford had seen some cases of acute hypotony in which the eye was very soft, the vitreous very cloudy, and the result not good. He thought the second operation should not be performed within a month, but this depended upon how much reaction had been produced by the first operation. There is little reaction with the Walker method. In his opinion, the Gradle electrode produces too much searing on the sclera and not enough in the choroid, and he prefers to do as much in the choroid as possible. However, that electrode is very useful in connection with the Walker pins to get

far back on the sclera. The results in younger people are usually better; the older the patient the less chance of a good result. Usually, operation after the age of 60 years is not advised if there is a good second eye.

SURGICAL RESULTS IN GLAUCOMA

DRS. LOUIS BOTHMAN and MARVIN J. BLAESS read a paper on this subject which was published in this Journal (December, 1936).

Discussion. Dr. Marvin J. Blaess said that one important point brought out by the statistics in this paper is the relationship between the signs and symptoms and the coexisting clinical condition of the eyes. Another, and more striking factor, is the fact that late postoperative infection is not so serious as we have always thought. The real drawback in glaucoma surgery is the fact that the tension continually rises again and again after repeated operations have been performed. With reference to infection, Dr. Bothman had mentioned a patient who had had numerous attacks of styes, conjunctivitis, and other superficial infections after a fistulizing operation, without permanent damage to the intraocular structures and no involvement of the uveal tract. Eerola's findings are as follows: In 5,616 Elliot trephining cases, the incidence of late postoperative infection was 1.8 percent; and in 954 Holth iridencleisis cases the incidence was 0.4 percent. That certainly does not constitute a major objection to fistulizing operations. Furthermore, it is far below the incidence seen in other fields of surgery.

In the British Journal of Ophthalmology, December, 1932, T. H. Butler reported 50 cases in which trephining was done for chronic glaucoma. Good results were obtained in 70 percent; cataracts developed in 10 percent; and 4 percent were lost by enucleation through operative complications; none were lost from late infection. In the Archives of Ophthalmology, September, 1933, Knapp reported the operative results of 200 cases of chronic glaucoma. Ninety-five patients were operated on by the Lagrange method and in 10 there was return of hypertension. Eighty were operated on with the trephine, and 20 had a return of hypertension. Iridectomies were performed on 12, and five had late return of hypertension. Iridotases were performed on five, and all five had a return of hypertension.

The two outstanding facts are that: in subconjunctival fistulizing operations late postoperative infection is not an important factor; and the operations in common use for glaucoma do not always hold the tension down.

Zorab, in 1912, originated a type of seton operation, and reported on 30 patients operated on by this method with good results. Mayou described the same operation but was not impressed by any advantages over the trephine operation. As described by Zorab, the operation consisted of a keratome incision under a conjunctival flap above. A small bend of suture material was then inserted into the anterior chamber and the ends allowed to protrude out under the conjunctival flap. This suture or seton acted much like a wick in keeping the aqueous filtering out under the conjunctiva. The operation was modified by Casey Wood in 1915. He inserted a Graefe knife with a perforation in the end, and after puncture and counterpuncture had been made he put a suture through the perforation in the knife and withdrew the knife, pulling the suture through the anterior chamber. He put a needle on each end of this suture and

carried the ends up under the conjunctiva.

The operation has now been further modified by Dr. Blaess (see this Journal, May, 1936).

This operation was first tried in absolute glaucoma with good results, and has been used in other cases, particularly for secondary glaucoma following aphakia. If there is a secondary rise in pressure such as often occurs in all other types of subconjunctival fistulizing operations, with all signs of recurring glaucoma, a few drops of butyn are instilled, each end of the seton is grasped with a pair of forceps through the conjunctiva, and it is drawn from side to side. In this way the drainage channels are again opened up to give more active filtration, the tension going down immediately. It acts like a paracentesis performed under the conjunctiva. In this way the patient is not subjected to a second surgical operation, which is something of practical importance. With the seton in place the full benefit that would be obtained from any secondary operation is had. In one patient on whom this operation was performed there were a four-plus Wassermann, glaucoma, and incipient cataracts. The vision in one eye was light perception only, in the other eye 20/50. In the poorer eye a seton operation was done, in the other an Elliot trephining. The eye with light perception still has the seton in it. The eye is pale and there has been no recurrence of redness at any time. In spite of the syphilis and poor physical condition there has been no iridocyclitis nor any sign of secondary inflammation, and the eye has remained normally soft over a period of more than a year.

Dr. M. L. Folk mentioned one patient cited by Dr. Bothman, operated upon years ago, in whom he said there was no late infection. That patient did have one late infection. He came to the Research Hospital with a very severe hypopyon, with pus running from the trephine wound into the anterior chamber. He was hospitalized for about a month and given foreign protein. The eye was saved.

Dr. Louis Bothman said in reply to Dr. Nugent concerning the mean pulse pressure, that if one studies the intraocular pressure in patients with high blood pressure, as a rule it is found that there is no relationship between the systolic pressure and the tension. In a series studied about 10 or 12 years ago, he had found many patients with a systolic blood pressure of 200 and an intraocular pressure of 20, but no attention was paid to the mean pulse pressure. In this series now cited, the figures were simply computed and are presented for what they are worth. However, a series of normals and glaucoma cases will be studied to learn if the data are of any value. These figures show the relationship for 95 cases. As to cloudiness of the lens following trephining operations, this too occurs without operation. Except in the cases in which there was a lens injury at operation, no more rapid change was seen after operation than in patients not operated upon. He could not agree with Dr. Nugent that the tension alone can be taken as an index of success of antiglaucoma operations, except in blind eyes. Robert von der Heydt.

COLLEGE OF PHYSICIANS OF PHILADELPHIA

SECTION ON OPHTHALMOLOGY

March 19, 1936

DR. C. R. HEED, *chairman*

GUMMA OF OPTIC NERVE

DR. W. S. REESE exhibited a colored girl, aged 16 years, who appeared at the

Pennsylvania Hospital on February 25, 1936, stating that three weeks ago she had developed frontal headache and noticed that she was losing the vision of her left eye. Three days ago the right eye became red and painful. Vision in the right eye was 6/9; in the left eye, hand movements. External examination revealed an episcleritis of the upper outer quadrant of the right eye and a pupil that did not react to light on the left side. Ophthalmoscopy of the right eye was negative except for some pseudoarteriovenous constriction and connective-tissue whorls along the superior temporal vessels. The left eye showed a marked succulent choked disc, the swelling being grayish, unlike the usual choked disc, and measuring from five to seven diopters. The macular region presented an incomplete star-shaped figure. The vessels over and at the edge of the swelling were very tortuous. The periphery of the fundus was negative. Physical examination was negative except for chronic tonsillitis and adenoiditis. Blood and spinal Wassermann tests were negative, but when repeated a second and third blood Wassermann were positive (plus 4). The papilledema gradually subsided and on March 12, 1936, numerous fine vitreous opacities appeared. The pains in her head which were most severe at night had diminished and vision was improving. In view of the positive Wassermann and other negative signs, the nocturnal pain, fine vitreous opacities, and response to antiluetic treatment a diagnosis of gumma of the optic nerve was ventured.

SYMPATHETIC OPHTHALMIA WITH SUBSTANTIAL RECOVERY OF VISION

DR. C. E. G. SHANNON reported the case of Mr. G. H. P., aged 34 years, who had been struck in the right eye by a nail. There was a penetrating wound of the cornea at the five-o'clock position, extending toward the center with prolapse of the iris and laceration of the crystalline lens. The patient was immediately sent to the hospital and given an injection of antitetanic serum, also appropriate local treatment. Three days later, the prolapsed iris was excised and the lens was extracted by the linear method, followed by a conjunctival flap operation. As a precautionary measure, daily injections of 5 c.c. of milk and large doses of salicylate of sodium were given. On August 12, 1935, four weeks after the accident, no evidence of sympathetic irritation nor inflammation appearing, the patient was discharged, although the injured eye was still slightly congested. While he was in the hospital, the laboratory studies of the blood revealed the following features: leucocytes 11,400; polymorphous cells 48 (normal 60-70); small uninuclear lymphocytes 42 (normal 15-30); large mononuclear lymphocytes 9 (normal 2-3); eosinophile 1. According to Brownlie, the presence of these blood changes should be regarded as early danger signs and of great importance. He states that "cases that may develop sympathetic inflammation should be periodically examined for these symptoms." The Wassermann and Kahn tests were negative.

The patient was readmitted to the hospital on September 19, 1935, with a history of lacrimation and diminution of vision of the sympathizing eye developing a week prior to readmission and approximately nine weeks from the date of injury. The right eye, the exciting eye, was painful and congested. Enucleation of the injured eye was recommended and carried out at once. Unfortunately, no microscopic study of the eyeball was made.

Four-and-one-half weeks later the left eye was still moderately congested

with tenderness on pressure. Vision was ability to count fingers at seven feet. Slitlamp study demonstrated infiltration throughout the substantia propria, precipitates on the posterior surface with many linear markings resembling folds in Descemet's membrane. There were many posterior synechiae while numerous pigment deposits were noted on the anterior capsule of the lens. The aqueous beam was slightly relucent, pupil irregular and moderately dilated.

With the ophthalmoscope, a dull-red reflex was seen but no fundus details were obtainable on account of the corneal infiltration and probably vitreous opacities. The tension, taken with the fingers, was apparently normal.

The patient was immediately sent to the hospital. Intravenous injections of typhoid vaccine were given every other day, beginning with 100 million germs, and gradually increasing this dosage; mercurial inunctions twice daily; and locally, atropine, dionin, and hot compresses. The reactions from the typhoid vaccine were satisfactory, the temperature reaching approximately 102 degrees after each injection. Following the third injection, the eye began to improve, and the vision was better. The treatment was continued until the patient had had 10 injections of typhoid vaccine. After three weeks of treatment, the vision in the left eye was 6/6 partly; with a plus 2.50 sphere he read Jaeger 4. It is probable that the disease had abrogated the power of accommodation. The slitlamp showed that the infiltration of the cornea had almost entirely disappeared but the pigment deposits on the anterior capsule were unchanged. With the ophthalmoscope, it was noted that the vitreous opacities had in a great measure been absorbed, and the details of the fundus were fairly clear, showing no gross lesions.

Discussion. Dr. G. deSchweinitz referred to the case history of a woman who came with fully developed sympathetic ophthalmia, the result of a neglected cut in the eye. She received the treatment which was customary a number of years ago, and ultimately obtained a complete cure, but not until a low-grade nephritis had yielded to treatment. He believed it was very essential in all cases of sympathetic ophthalmia to make a thorough general examination and to eliminate any general disease factor that might be discovered. He said he believed it was Dr. Knapp who had made reference to this matter, and recommended that, for example, diseased tonsils should always be extirpated.

Dr. H. Maxwell Langdon said that concerning the enucleation of the exciting eye a great deal of consideration should be given before this is done. If the eye is blind it should be removed as removal may possibly do some good even if the sympathetic attack has started. If, however, the eye has vision which is at all useful it probably had better not be removed, as after the sympathetic attack this eye may be the better of the two. This, of course, does not apply to eyes which may cause sympathetic disease before such an attack has started. Here removal is definitely indicated.

Dr. J. Milton Griscom said that Dr. Jonas Friedenwald had made the suggestion that exposure to ultraviolet light of the bodies of patients suffering with sympathetic ophthalmia might result in a stimulation of pigment in a locality distant from the eye, thus supplying an antigen which would combine with the antibodies. He has treated three cases by this method with favorable results.

ANGIOID STREAKS OF THE RETINA WITH PSEUDOXANTHOMA ELASTICUM AND DISCIFORM MACULAR DEGENERATION

DR. EDMUND B. SPAETH AND DR. JOSEPH I. GOUTERMAN described a typical case in a colored female, 58 years of age, in which the characteristic ocular lesions consisted of bilateral circumpapillary rings (complete in the left and incomplete in the right eye) and radiating vessellike streaks on a slate-gray peripapillary zone; extensive hemorrhages in various stages of absorption, limited largely to the posterior poles; and a disciform macular exudative mass. The clinical dermatologic lesions were quite pathognomonic of pseudoxanthoma elasticum. A biopsy of the skin established the diagnosis.

Discussion. Dr. William Zentmayer said that the patient whose ocular fundus was shown on the screen had been under his observation for 25 years. In 1934 he was reëxamined at the request of Dr. Terry for evidence of osteitis deformans. He was thoroughly studied by Dr. Arnett and X-ray films of the skeleton were taken, but there was no evidence of Paget's disease.

The fundus at that time showed in both eyes the obliteration of all the pigment streaks except a small segment remaining in one eye. The choroidal vessels over almost the entire fundus were converted into fibrous tissue and there was also some proliferation. Only in the periphery could a normal reflex be obtained.

Dr. Gouterman's case is of special interest because of the association of the streaks with disciform macular degeneration. Batten has called attention to the frequency with which circinate retinitis, which is allied to disciform macular degeneration, is found in association with angioid streaks.

The subsequent history of Dr. Verhoeff's case, as given by Dr. Terry, is that the halo about the papilla is more prominent, and black streaks are now noticeable.

This of course would strengthen Verhoeff's assumption that the opposite eye, on which he made a histological study, was the seat of angioid streaks.

Inasmuch as up to 1934 but nine cases of angioid streaks in association with Paget's disease have been reported, and the examination of 22 cases of Paget's disease showed angioid streaks in three, and 23 cases of pseudoxanthoma elasticum with angioid streaks have been reported, he believed unless the two general conditions have a common pathogenesis that there must be some underlying common cause for the skin condition and the eye condition.

A. G. Fewell,
Clerk.

ST. LOUIS OPHTHALMIC SOCIETY

March 21, 1936

DR. CARL T. EBER, *president*

MYDRIATICS FOR ELDERLY PATIENTS

DR. LAWRENCE T. POST read a paper on this subject which is published in this number of the Journal.

Discussion. Dr. W. H. Hardy said that he formerly used a mixture of 1-percent cocaine and 1-percent euphthalmine but was now using a 2-percent solution of euphthalmine alone. This had never produced pain and had never caused an increase of intraocular tension. He always contracted the pupil to normal again with pilocarpine.

Dr. B. Y. Alvis said that suprarenin bitartrate reduced the intraocular tension almost without exception. He had used the drug extensively and some

times it would induce an acute rise in tension causing serious pain. For that reason he always kept the patient in the office for an hour or so after using the medicine. He felt that one must be very cautious in the use of suprarenin as a mydriatic.

Dr. Lawrence T. Post said that cocaine and euphthalmine when used together were much more powerful than when either one was used alone. He had never known this mixture to cause pain. He said in answer to Dr. Keller's question regarding pain after the use of adrenalin that the pain was probably caused by the constricting effect of the vessels. Also, it might have been possible that Dr. Keller's patient was extremely sensitive to the drug. He used eserine to constrict the pupil after the use of suprarenin because eserine was the most useful drug for the production of miosis.

ANCIENT OPHTHALMOLOGY

Dr. E. C. Spitze read a paper on this subject.

MARKED EXOTROPIA TREATED WITH CONCAVE LENSES

Dr. M. L. Greene read a paper on this subject which will be published in this Journal.

Discussion. Dr. Lawrence T. Post said that Dr. Green, Sr., used to make a common practice of giving a patient stronger lenses than were needed in a marked degree of exophoria. He had done so a number of times and it did tend to give an exophoric patient comfort. To prevent the increase in myopia, few people advocated the use of prisms, base in. This was the exact opposite of what Dr. Edward Jackson taught. We do not know a great deal about the cause of myopia. There are many who think that accommodation and convergence have nothing to do with it.

Dr. Max Jacobs mentioned the case of a young lady who had obtained relief by an overcorrection of minus lenses with no resultant influence on the muscles.

Dr. M. L. Greene said that he began overcorrecting myopia in patients who had a marked exophoria for near. One striking case was that in a woman 37 years of age, who had a tendency to divergence. This was entirely corrected by an overcorrection of one diopter. For the first time it was possible for her to read several hours in comfort. In regard to young children, he had always corrected the myopia to the limit and in some cases an overcorrection of one-half to one-quarter diopter was not a disadvantage.

H. Rommel Hildreth,
Editor.

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Author's proofs should be corrected and returned within forty-eight hours to the *manuscript editor.* Twenty-five reprints of each article will be supplied to the author without charge. Additional reprints may be obtained from the printer, the George Banta Publishing Company, 450-458 Ahnaip Street, Menasha, Wisconsin, if ordered at the time proofs are returned. But reprints to contain colored plates must be ordered when the article is accepted.

THE NEW FORMAT

With this issue the American Journal of Ophthalmology is adopting several changes in format which, it is hoped, will be of material benefit to the reader. Probably the first change that will catch the attention of the reader will be the front cover. In order to facilitate legibility, the size type in which the contents are written has been increased, and to improve the appearance the black box has been removed. To accomplish the increased size of headings the titles have been condensed and the detailed listings under department heads have been omitted. These elements appear in full as heretofore on the complete table of contents on Advertising page v.

The second feature, or perhaps the first if the changes on the cover page do not at once catch the eye, will be the increase in bulk. Twenty-four pages have been added and will be added in succeeding numbers. The increased number of pages not only permits of publishing more material but is occasioned also by a change in the structure of the printed page. The two-column format has been retained as being easier to read than the wide single column, the eye having less distance to travel in returning the gaze from the end of one line to the beginning of the next. Ten-point type, which is the most convenient size, has also been retained, but the space between lines has been increased considerably. This does

away with some confusion that occasionally arises from narrower spacing. These changes have been made in every department except the Abstract Department, where a maximum of material in a minimum of space is desirable.

A further improvement is the better quality of paper. The general appearance is better, especially in the reproduction of illustrations, and the pages will not show age changes so early as will inferior paper.

It has been thought best to omit publication of abstracts at the beginning of articles because this is usually a repetition of the summary and because it is very difficult to do justice to the paper in a short abstract. It was thought, furthermore, that presentation of an abstract often did not serve the purpose of inducing reading of the article but gave instead a wrong impression to the reader that after reading the abstract he was sufficiently familiar with the article without proceeding further with it.

Minor changes will be less use of bold face and more of italics and, in general, more variety in type.

Not all of these changes will appear in this issue, as some manuscripts had been set up before the details of the new plan could be completed, so that the change-over will, in part, be gradual.

In this issue we have published the first of a series of articles presented by Lieut.-Col. Wright to ophthalmologists attending the Los Angeles course in 1936. We believe that thoughts on cataract and glaucoma from the pen of the most experienced eye surgeon in the world could not fail to interest our readers.

The editors sincerely hope that the new format will be pleasing to our subscribers and that the new year will continue to bring them happiness and success.

Lawrence T. Post.

THE BALTIMORE SOUTHERN MEDICAL ASSOCIATION MEETING

The week of November 17th found Baltimore in good weather, which added greatly to the success of the thirtieth annual meeting of the Southern Medical Association. Forty-five hundred physicians, wives, medical students, and exhibitors overpacked the hotels of the city, but certainly no one went hungry, for the seafood was at its best.

The meetings were held in the Fifth Regiment Armory, especially suited to the exhibitors' section as well as for registration. From the rafters of the enormous main exhibition hall a loud speaker, in good voice, called visitors to the telephone and as well made it possible readily to locate friends. The system seemed to work perfectly.

Of the medical exhibitions interesting to ophthalmologists, special mention must be made of a photographic display by the Wilmer Institute. To copy such a selection would be noteworthy; to have initiated it is most commendable. A great many of the pictures were stereoscopic, and this feature added to the very excellent colored reproductions made it an exhibit of lifelike photographs of the greatest teaching value. Too much praise cannot be given to the group behind this work, for the quality and completeness of the collection should be a stimulus toward the making of others.

The sections of ophthalmology and otolaryngology attracted a group of about three hundred, which was a good attendance since the meeting followed so closely after the Academy meeting in New York in October. On the whole, the section meetings were very successful. A symposium on glaucoma by the Baltimore group was rich in facts and suggestions.

The section may possibly have outgrown its best usefulness, as such, and

would justify expansion into two groups representing ophthalmology and otolaryngology separately. While probably three quarters of the members are practicing both ophthalmology and otolaryngology, it is quite possible that separate programs would be more stimulating and would promote more active discussion. The program might still be arranged so that one individual could attend all meetings.

New Orleans will be the meeting place next year and will attract a large crowd. To make hotel reservations early would be a friendly suggestion.

H. Rommel Hildreth.

THE AMERICAN ACADEMY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY

When ophthalmologists band together to form a society, they may have one or more of several purposes in view, and as years pass by these aims may be altered according to the complexion of the membership. Primarily, all societies are developed for the exchange of views by the members. Then the group gradually becomes a forum where new ideas may be expressed or old views presented in an altered form. The majority of societies stop at that point, but some advance into the economic aspect or the legislative aspect and endeavor to mold public opinion according to the ophthalmological viewpoint.

The Academy, however, has developed along radically different lines. Organized some forty-three years ago as a forum for the discussion of eye, ear, nose, and throat topics, it still retains the forensic aspect as the parent activity. The first deviation was in 1914, with the organization of examining committees to pass upon the professional qualifications of applicants for membership, from which activity arose the Boards of Ophthalmology and Otolaryngology, whose example all of the Specialty Boards are following. Then, in 1921, came the Section on Instruction, the first major effort at postgraduate mass teaching. This was followed by the Section on Pathology, in which the active cooperation was established between the Army Medical Museum and civilian ophthalmology with many mutual benefits. Thanks to the care and wisdom of the Academy treasurer, Dr. Large, sufficient funds have been available to permit of grants for research to various men in the special fields. The Teachers' Section was the next development, in which efforts were made to correlate the practical experience of the Academy members with the theoretical knowledge of the Deans of the Medical Schools for the betterment of the teaching of the specialties in both undergraduate and graduate life. Within the past three years, there has been elaborated another section, devoted to the use of cinematography in the specialties, in which the members have the opportunity of presenting moving pictures of such special work as they may have been doing. And last, but not least, the Academy is working to establish centers for instruction in the basic fundamentals of eye, ear, nose, and throat for the graduate student in accordance with the suggestion of the retiring president, Dr. Frank Burch. But despite all these varied activities, the parent program is still the major function of the Academy.

Thus the development of the Academy has been along two major lines. The first and original one is to provide a place wherein the eye, ear, nose, and throat men of the United States can meet to exchange views upon their specialties. The second is to provide means whereby the members can advance their own knowledge through close contact with and from practical teaching by the acknowledged leaders of the profession. This has been

developed upon a mutual exchange basis rather than upon a scholastically didactic platform. Therein lies the major bond that ties the membership into a compact unit. This bond is strengthened by the intimate form of the annual meeting.

Harry S. Gradle.

BOOK NOTICES

DETACHMENT OF THE RETINA. By H. Arruga, M.D., of Barcelona; translated by Ramon Castroviejo. Cloth binding, 138 pages, 226 illustrations, many in color. Printed in Barcelona, 1936. Price not stated.

This volume contains the most beautiful colored illustrations of retinal detachment that the reviewer has ever seen. They themselves constitute a sermon on the subject. The text brings the discussion up to date and presents it in a clear and satisfactory manner.

The first chapter on the etiology considers myopia and trauma as outstanding factors favoring production of detachment. As secondary causes are chorioretinitis of low degree and senile degeneration of the retina.

The subject of pathogenesis includes a discussion of theories of distension, of choroidal exudation, and of retraction of the vitreous. No explanation thus far is regarded by the author as entirely satisfactory. He states that "what really happens in an eye with retinal detachment depends on a number of as yet incompletely known factors." He regards it as an accident usually due to previous retinal disease although the retina at the time may play a passive rôle.

As regards pathological anatomy, the dominant lesions are those of atrophy and cystoid degeneration. Vitreous lesions are probably quite important.

A chapter is given to symptomatology. Much stress is laid on the careful preliminary ophthalmoscopic examination as a guide in selecting the most suitable operative technique, and again during the operation in order to control the effect obtained.

A long section is used for discussing the nature of retinal tears. The most frequent location is the upper temporal quadrant; following in frequency are the superior nasal, the inferior temporal and inferior nasal, one half of the rents being in the superior temporal quadrant. The shape and size of the rent must be studied most carefully, as the treatment to be instituted depends on these factors.

Figures on three hundred of the author's cases indicate the prognosis. Of patients operated upon less than fifteen days after detachment, 50 out of 62 were cured; when the time interval until operation lay between fifteen days and one month, 41 out of 57; between one and three months, 42 out of 80; between three and six months, 19 out of 56; between six months and one year, 11 out of 29; between one and two years, 2 out of 12; after two years, none out of 4. This constitutes an overwhelming argument for early intervention.

Approximately the last half of the book is devoted to treatment. The historical review is fairly complete, although it omits some well-known contributors.

The author tends rather to critical analysis of the known methods than to didactic giving of advice. The book is an extremely interesting and valuable contribution to the subject of detachment.

Lawrence T. Post.

TRANSACTIONS OF THE AMERICAN OPHTHALMOLOGICAL SOCIETY. 575 pages. 1935, Volume 33. Philadelphia, Wm. F. Fell Co., Printers.

This volume contains 36 papers on a wide variety of ophthalmic subjects, the

value of the papers being increased by the discussions appended. The differentiation of alternating types of concomitant squint was prested by Dr. Luther C. Peter who believes that true alternating squint does not respond to fusion training and that with monocular estropia the results of training are good. Clifford B. Walker wrote on the diathermic and galvanic treatment of separated retina. Single and multiple micro-electrodes and the technique of application are described. The use of transillumination for localizing retinal tears is mentioned. The paper describes in detail the mechanical devices which the author uses for closing retinal tears by catholysis. Verhoeff in discussing the paper described a method of replacement of the separated retina by the injection of saline into the vitreous. Thomas H. Johnson reported 49 cases of verified brain tumor with homonymous hemianopia. A homonymous field defect associated with papilledema is strongly significant of brain tumor—this type of field indicates only that the lesion is posterior to the optic chiasm. Ralph I. Lloyd described a particular type of macular degeneration which is hereditary, bilateral, and shows the same rate of progress for the individual family. John Green found that the surgical removal of Bowman's membrane in the area involved in bullous keratitis permits a permanent adhesion of the newly formed epithelium to the substantia propria. Harry S. Gradle reported on the effects of mydriatics upon intraocular tension in a series of 500 patients over the age of 30 years. The average primary pressure with the Gradle-Schiötz tonometer for 1000 eyes was 19.63 mm. Hg. The refractive error present does not seem to influence the pressure. In 0.9 percent of the cases the increase in pressure under mydriasis led to further investigation, which established the presence of a preglaucomatous condition! Friedenwald and Stiehler found that the vitreous framework is made up of extremely thin sheets running parallel to one another and that the viscosity of the vitreous filtrate is increased by a nonprotein substance which is present in a very low concentration. Yudkin and Arnold were able to produce lenticular opacities in albino rats by feeding a diet containing a high proportion of lactose or galactose. The clinical and pathological picture of posttraumatic retinitis (retinitis serosa) was presented by Bernard Samuels. Vail recorded a case of epithelial downgrowth into the anterior chamber following cataract extraction. The condition was arrested by radium treatment. O'Brien reported 75 cases of detachment of the choroid after cataract extraction; the detachment occurred almost invariably at the time of operation. Ellett reported on a series of 188 cases of cataract extraction examined from 5 to 30 years after operation. Useful vision was retained in 177 cases. Greenwood and Grossman analyzed the results of 1343 intracapsular cataract extractions by the Verhoeff method. The operations were performed by 48 operators. The loss of vitreous occurred in 6.2 percent of the series. The lenses and capsules were completely delivered in 95.4 percent of the cases. Scarlett and Strumia studied the effect of bacterial lysates in staphylococcus keratoconjunctivitis in rabbits and concluded that the action is due to the dissolved bacterial proteins. Filamentary keratitis was described by Beetham, who found that satisfactory therapeutic results were obtained by obliterating the puncta. Frost reported two cases of papilledema which were relieved by operations on the posterior nasal sinuses. Gundersen found in herpes zoster that if whole convalescent blood is given before the fifth day following vesiculation, marked benefit may be promptly secured. Keller described the

clinical and ophthalmoscopic picture of retinal periphlebitis in septic endophthalmitis. The surgical treatment of complicated after-cataract by the de Wecker procedure was discussed by Webb W. Weeks. The papers indicate the continued interest in surgical and therapeutic problems and the widening field of physiological research in ophthalmology.

William M. James.

TRACHOMA. By A. F. MacCallan, M.D., F.R.C.S. President of the International Organization Against Trachoma. Formerly Director of the Egyptian Government Ophthalmic Hospitals. 238 pages. 19 illustrations and charts. London, Butterworth and Company, 1936. Price £1. 1. 0. net

This book embodies the Hunterian Lecture on "The surgery and pathology of trachomatous conjunctivitis," given at the Royal College of Surgeons in England in 1936. It also takes the place of its author's former book, "Trachoma and its complications in Egypt." It must be regarded as the most complete and authoritative treatise on trachoma that has yet been published. Of the illustrations, eleven are color plates, showing different stages and conditions of trachoma. Others show microscopic appearances, and the appended chart illustrates the correspondence between temperature and the number of new patients treated in the Egyptian Ophthalmic Hospitals, for the different months of the year. There are good indexes of the subjects and authors mentioned. The chapter headings give a good idea of the arrangement of the material: 1. Introduction to the study of trachoma. 2. Clinical manifestations. 3. Sequels. 4. Complications. 5. Differential diagnosis. 6. Treatment. 7. Pathological anatomy. 8. Epidemiology. 9. Historical.

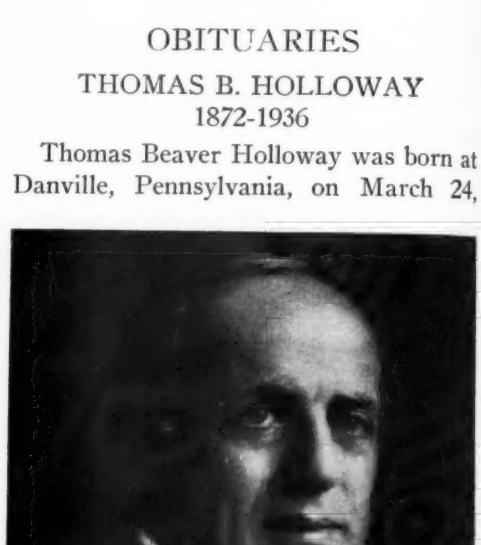
All ophthalmologists have to do with trachoma and its effects. To those whose practice includes a large number of cases, a study of this book will be both interesting and of great practical value. For those who see comparatively few cases, it is the best possible book of reference.

Edward Jackson.

OBITUARIES

THOMAS B. HOLLOWAY
1872-1936

Thomas Beaver Holloway was born at Danville, Pennsylvania, on March 24,



Dr. Thomas B. Holloway

1872. He was eduacted at Lafayette College, receiving the degree of B.S. in 1894, and M.S. in 1897. He studied medicine at the University of Pennsylvania and received his M.D. in 1897. As a student his bright, active mind attracted the attention of his teachers; and he quickly became a valued assistant in the clinical teaching of ophthalmology. In 1915 he was made Professor of Diseases of the Eye in the Philadelphia Polyclinic, and continued in that position, being made Vice-Dean when it became the Graduate School of Medicine in the University of Pennsylvania. From

1926 he was the head of the Eye Department of the Medical School until his death.

When teaching optics and the physiology of the eye, he devised apparatus for the illustration of the refraction of the eye, which he demonstrated before the Section on Ophthalmology of the College of Physicians of Philadelphia, and in 1922 before the American Ophthalmological Society.

In 1908 he and Dr. de Schweinitz published a monograph on "Pulsating exophthalmos, and its treatment." He became a member of the Section on Ophthalmology of the American Medical Association in 1907, and in 1909 joined with Dr. de Schweinitz in presenting before that body a paper on the "Operative treatment of papilledema dependent on intracranial tension." In 1912 he again joined Dr. de Schweinitz in a paper on "Visual-field defects in hypophysis disease." In addition to the papers he presented, Dr. Holloway made valuable scientific contributions in discussion of papers presented by others. In 1929 he was chosen chairman of the Section. In his chairman's address in 1930 he made valuable suggestions on the correlation of university research.

Dr. Holloway was elected a member of the American Ophthalmological Society in 1909; and in 1910 he read before it a paper reporting three cases of congenital pigmentation of the cornea, the so-called "Krukenberg's spindle," which brought this subject to the attention of American ophthalmologists. From this time on, in papers and discussions he was an active contributor to the Society's Transactions. Among the more important of his papers were "Retinitis pigmentosa with albuminuric neuroretinitis," 1911; "Cranial deformity associated with ocular changes," 1914; "Two cases of orbital tumor," 1916; "Asteroid hyalitis," 1917, in which he reported four new cases and reviewed the accounts of others in the American and European literature. In 1918 Dr. Holloway was made secretary-treasurer of the Society. In 1932 he was elected vice-president, and in 1933 president of the American Ophthalmological Society. During the years he was an official he did not present papers, but added much of value by his discussions of papers read by other members of the Society. In 1935 he presented another paper, with the collaboration of Dr. W. E. Fry, in which was reported a case that they had seen of complete detachment and folding of the retina into a mass in front of the optic disc, following a blow on the head, without evident injury of the eyeball. They also collected from the literature cases apparently similar, and thus established this new clinical entity, at a time when retinal detachment is attracting special interest.

His interest in the teaching and literature led Dr. Holloway to his active assistance in the preparation of the Ophthalmic Year-Book. From 1914 until the merger of journals in the American Journal of Ophthalmology, he prepared for the Year-Book its chapters on the crystalline lens and the vitreous. His wide acquaintance with the literature of ophthalmology, and his excellent judgment in selecting valuable new suggestions were illustrated in these chapters.

Dr. Holloway early developed his interest in the care of the blind and the prevention of blindness. In 1909 he was appointed ophthalmologist to the Pennsylvania Institution for the Instruction of the Blind now located at Overbrook, just outside of Philadelphia. Among its pupils he encountered some of the rare conditions described in his papers.

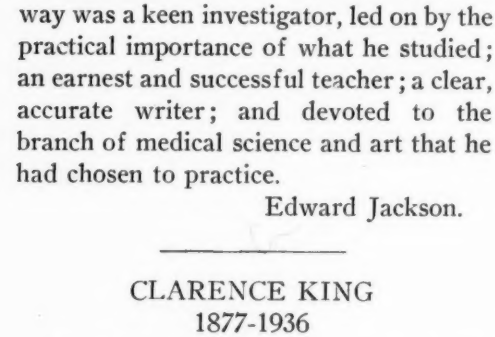
He was from 1922 to 1926 an attending surgeon to Wills Hospital. For several years he was Director of the National Society for the Prevention of Blindness. In the Sight-Saving Review of June,

1935, he published an important article on "The new statistics of causes of blindness among children." Thomas B. Holloway was a keen investigator, led on by the practical importance of what he studied; an earnest and successful teacher; a clear, accurate writer; and devoted to the branch of medical science and art that he had chosen to practice.

Edward Jackson.

CLARENCE KING
1877-1936

On Saturday afternoon, August 15, 1936, his friends and colleagues were



Clarence King

shocked to read of the accidental death of Clarence King, which occurred in Grape Bay, Paget, Bermuda. It was the final day of a well-earned month's vacation. Early in the morning he and Mrs. King had planned a last swim together. With his characteristic enthusiasm, which was part of his personal charm, he dashed into the water a few yards ahead of his wife, and struck out with vigor into deep water. Caught by a treacherous undertow, Mrs. King called to him. As he started to swim toward her, she gave up the struggle with the undertow, turned on her back and floated on the surface, above the perilous lower current and called out that she was safe. Apparently unwilling to trust the waves to carry her to the beach, Doctor King swam on towards her. She lost consciousness just as he reached her side. When she regained her senses, passersby had brought her and her husband's drowned body onto the beach.

Born in 1877 in Newport, Kentucky, Clarence King was graduated from the Medical College of Ohio in 1901 (which later became the Medical College, University of Cincinnati) and interned in the Good Samaritan Hospital, Cincinnati, in 1901-1902. During the subsequent years he studied under Hofrat Fuchs and others in Vienna and later in Berlin, after which he returned to Cincinnati to practice ophthalmology. He went to Amritsar, United Provinces, India, in 1912 and there performed a large amount of ophthalmic surgery, chiefly cataract operations, during the season under Col. Henry Smith. He and Mrs. King were married in 1914. As a major in the Army Medical Corps during the World War, Dr. King served at Base Hospital 25, Evacuation Hospital No. 4, Coinay, France, and as consulting ophthalmologist in the Allery Area, A.E.F. Evacuation Hospital No. 4, in Coblenz, Germany.

He served as attending surgeon and director of the eye service at the Cincinnati General Hospital, and also director of the eye service at the Children's Hospital. He had been on the faculty of the Medical College, University of Cincinnati, for more than two decades, and had been assistant professor of ophthalmology when he assumed the full professorship upon the death of Dr. Victor Ray, Sr., several years ago.

His all too brief career as professor of ophthalmology was characterized by his painstaking reorganization of the depart-

ment. He supervised and planned the purchase of the latest and best equipment available for the out-patient eye department of the Cincinnati General Hospital. He disliked didactic lectures, and devoted an enormous amount of time to the preparation of lectures, mimeographed copies of which he distributed to the students. The lecture hour was thus free for clinical demonstrations and the exhibition of beautifully colored lantern slides, prepared under his direction. His course was a popular one with the students.

In 1927 he went to Vienna and spent several months working with Professor Meller. Here he studied and worked up the large numbers of cases described so thoroughly in his candidate's Thesis for the American Ophthalmological Society "Tuberculous iridocyclitis as a cause of the heterochromia of Fuchs (Trans. Amer. Ophth. Soc., 1927, v. 25, p. 380). His wide knowledge and great love for German medical literature was one of his chief interests. His work in Meller's clinic started him on the pursuit of the subject of ocular tuberculosis, which he kept up the rest of his life, and upon which he lectured and gave courses in various parts of the country.

His published articles were not numerous, about a dozen titles in all, but were characterized by almost painful preparation, meticulous accuracy in citations and the giving of proper credit, and by well-rounded, terse phrases. He scorned to present a paper which was not as perfect as his rigid self-standard allowed.

Dr. King was an active and useful member of the Academy of Medicine of Cincinnati, a Fellow of the American College of Surgeons, a member of the American Academy of Ophthalmology and Otolaryngology, American Medical Association, and the American Ophthalmological Society, in which he held several important committee offices.

His strong character combined the highest of ethical standards, honesty, loyalty and kindliness. He had great personal charm, enhanced by a slight traumatic ptosis of the left upper lid and the friendliest of smiles. A shy, studious manner, which was of a boyish sort, won him innumerable warm friends and no enemies. Controversies and bitter words were not for him, although he could be stubbornly determined in what he thought was the right course.

ABSTRACT DEPARTMENT

EDITED BY DR. WILLIAM H. CRISP

Abstracts are classified under the divisions listed below, which broadly correspond to those formerly used in the Ophthalmic Year Book. It must be remembered that any given paper may belong to several divisions of ophthalmology, although here it is only mentioned in one. Not all of the headings will necessarily be found in any one issue of the Journal.

CLASSIFICATION

1. General methods of diagnosis
2. Therapeutics and operations
3. Physiologic optics, refraction, and color vision
4. Ocular movements
5. Conjunctiva
6. Cornea and sclera
7. Uveal tract, sympathetic disease, and aqueous humor
8. Glaucoma and ocular tension
9. Crystalline lens
10. Retina and vitreous
11. Optic nerve and toxic amblyopias
12. Visual tracts and centers
13. Eyeball and orbit
14. Eyelids and lacrimal apparatus
15. Tumors
16. Injuries
17. Systemic diseases and parasites
18. Hygiene, sociology, education, history
19. Anatomy, embryology, and comparative ophthalmology

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CONJUNCTIVA

Grancini, Enrico. **Contribution to the study of conjunctival cysts.** Boll. d'Ocul., 1936, v. 15, July, pp. 781-798.

Superficial subconjunctival cysts occurred in the left lower lid of a man 23 years of age and the right lower lid of a woman of twenty years. Another cyst of the left upper lid is described in a boy of twelve years. It appeared to belong to Krause's or Ciaccio's glands. Histologic description is given and the mechanism of formation is discussed. The lid margins of these patients are red and are affected by squamous eczema, and the conjunctivas show signs of chronic inflammation. The writer regards the exudative-lymphatic constitution of the patients as a generic causal factor of cystic formations of mucous membranes, due to chronic inflammation, especially if an uncorrected hypermetropia exists as in his first two cases. (Bibliography, 12 figures.)

M. Lombardo.

Heinonen, Oskar, **Phlyctenular eye disease and pediculosis**. Acta Ophth., 1936, v. 14, pts. 1-2, p. 187.

From review of the literature and analysis of the author's own material, the conclusions are that in some cases there is a relation between pediculosis and phlyctenulosis, but that the significance of the former is of secondary importance. Ray K. Daily.

Hradecka, J., and Knobloch, R. **Further remarks on the effect of milk injections in blennorrhea of the new-born.** Ceskoslovenska Oft., 1935, v. 2, no. 3, pp. 190-194.

Statistics of two institutes for the blind show the number blinded by ophthalmia neonatorum. Since 1920, under milk injection therapy, the number so blinded markedly decreased, though the incidence of ophthalmia neonatorum has almost doubled since 1926; and the duration of the illness has been reduced from an average of 23 to an average of 12 days. Corneal complications have fallen from thirteen to two percent. The milk must be injected as soon as the diagnosis is made. There were no untoward results from the injections. G. D. Theobald.

Kisseleva, E. **Pemphigus of the eye.** Sovietskii Viestnik Ophth., 1936, v. 9, pt. 1, p. 49.

A report of two fatal cases.

Ray K. Daily.

Massoud, Farid. **Trachoma as an endemic disease in Egypt.** Bull. Ophth.

Soc. Egypt, 1935, v. 28, pp. 215-221. (See Amer. Jour. Ophth., 1935, v. 18, Oct., p. 952.)

Merrill, H. G. **Epidemic keratoconjunctivitis diversiformis.** Amer. Jour. Ophth., 1936, v. 19, Nov., pp. 1007-1008.

Römmelt, Joseph. **Coincidence of tuberculosis of the conjunctiva with phlyctenules,** Zeit. f. Augenh., 1936, v. 90, Sept., p. 1.

An eleven-year-old boy had a swollen upper lid, on the conjunctival surface of which were thick fleshy granulations and a few grayish ulcers. Biopsy revealed typical tuberculous granulation tissue. The child was treated with injections of bacillary emulsion, and one month later typical phlyctenules appeared which disappeared in one week with no other treatment than atropine and noviform ointment. Specific treatment was continued.

The significance of phlyctenules is discussed. True phlyctenules are always a sign of a state of specific immunity. This immunity need not, however, be exclusively against the antigen of a tuberculous infection. Typical phlyctenules have been observed in endogenous gonorrheal metastatic conjunctivitis. F. Herbert Haessler.

Tilden, E. B., and Gifford, S. R. **Filtration experiments with the virus of inclusion blennorrhea.** Arch. of Ophth., 1936, v. 16, July, pp. 51-54.

The experiments reported add further evidence that the virus of inclusion blennorrhea is filtrable through graded colloidal membranes and is transmissible to the sphinx baboon. The etiologic importance of the inclusions is increased by the fact that elementary and initial bodies were demonstrated in material obtained from baboons in which the disease had been produced either by filtered or by unfiltered material. J. Hewitt Judd.

Turner, N. H. **A very satisfactory operation for pterygium.** Virginia Med. Monthly, 1936, v. 63, May, p. 106.

Turner's operation is an elaboration of the original Desmarres' procedure. It differs from the McReynolds in that the conjunctiva is divided from the upper border of the growth for about one-quarter inch from the limbus toward the canthus. The greater portion of the growth including the superior margin is buried behind the lower part of the conjunctiva, and the denuded area is then covered with adjacent conjunctival tissue. Theodore M. Shapira.

Wilson, R. P. **Blastomycosis of the conjunctiva.** Bull. Ophth. Soc. Egypt, 1935, v. 28, pp. 99-103. (See Amer. Jour. Ophth., 1935, v. 18, Dec., p. 1166.)

6

CORNEA AND SCLERA

Biozzi, Giuseppe. **Guttate cornea and associated findings.** Saggi di Oft., 1934-36, v. 8. (See Amer. Jour. Ophth., 1935, v. 18, May, p. 480.)

Caramazza, Filippo. **The etiology of keratoconus and the use of contact glasses.** Saggi di Oft., 1934-36, v. 8. (See Amer. Jour. Ophth., 1935, v. 18, June, p. 584.)

François, J. **Marginal degeneration of the cornea.** Arch. d'Opht., 1936, v. 53, June, p. 432; July, p. 540; Aug., p. 616.

The author reports two cases in detail, reviews the literature, and presents an exhaustive study of this rather rare affliction. The most effective treatment is excision of the ectatic portion or cauterization before ectasia has developed, and use of a conjunctival flap to cover the affected portion and to produce a firm scar. (Bibliography, illustrations.) Derrick Vail.

Freiberger, Moses. **Corneal dystrophy in three generations, with a genealogical chart.** Arch. of Ophth., 1936, v. 16, Aug., pp. 257-270.

The author reviews the literature and reports nine cases in three generations in which typical findings were present. The condition is inherited as a dominant trait and is not sex-linked. The majority of cases are myopic. No treatment is of any avail. J. Hewitt Judd.

Friede, Reinhard. **Penetrating homokeratoplasty with cadaver transplants.** Arch. f. Augenh., 1936, v. 110, Sept., p. 90.

Eleven cases are described in which the author used corneal transplants from fresh cadavers. Among the nine cases operated on the transplant when healed was entirely transparent in six instances, translucent once, and entirely opaque twice. In two other cases operated upon recently, the corneae are entirely clear and the prognosis very good. The author claims that the vital energy of the cornea of an enucleated eye is severely weakened by the disease process which caused the enucleation and therefore that transplants taken from such eyes become opaque more frequently. To retain the vital energy of the corneal flap the cadaver must never be older than six hours, and the flap must not be placed in conserving fluid, but it may be put for a short time only on a gauze pad soaked with sodium chloride. To increase the nourishment of the corneal flap the author institutes early treatment beginning with the fourth day after transplantation. It consists in paracentesis, milk, and subconjunctival injections of sodium chloride. R. Grunfeld.

Karsch, Johannes. **Secondary band-shaped corneal opacity in polyarthritis chronica leucocytica (Still) and lymphocytica (Rohnheimer).** Arch. f. Augenh., 1936, v. 110, Sept., p. 106.

The corneae of two young boys showed a band-shaped keratitis secondary to iridocyclitis of earlier years. Both patients suffered from polyarthritis. Leucocytes were found in the fluid obtained from the joint of one boy, lymphocytes in that from the other boy. Since lues and tuberculosis could be excluded as etiologic factors, and these according to Fuchs are the only causes of juvenile iritis, the author feels justified in considering that the iridocyclitis in these cases was a manifestation of leucocytic or lymphocytic metastasis.
R. Grunfeld.

Lagleyze, Pedro. **Corneal tattooing.** Arch. de Oft. de Buenos Aires, 1936, v. 11, Feb., p. 43; March, p. 133; April, p. 188; and May, p. 288.

These four parts continue the article of which an abstract was published on page 935 of the October, 1936, issue of the American Journal of Ophthalmology. The further subjects discussed include the older mechanical methods of introducing powders in suspension, the instrumentarium, available colors, chemical methods (with review of their literature), and the related histology. The author practices the platinum-chloride method and finds it satisfactory. (Extensive bibliography.)
M. Davidson.

Lugli, Luigi. **"Oil-globule" degeneration of the cornea.** Saggi di Oft., 1934-36, v. 8. (See Amer. Jour. Ophth., 1936, v. 19, Jan., p. 64.)

Moretti, Egisto. **Acute hemorrhagic bleb of the cornea.** Reprint from Bollettino della Soc. medico-chirurgica di Catania, 1936, v. 4, no. 8, pp. 441-451.

The patient was a woman of 64 years with glaucoma and arterial hypertension. The corneal bleb consisted of an area of Bowman's membrane which was elevated by blood arising from a vascular loop which ran across the cornea and had ruptured. The literature is partially reviewed. W. H. Crisp.

Petri, Mario de. **Contribution to the therapy of keratohypopyon.** Saggi di Oft., 1934-36, v. 8. (See Amer. Jour. Ophth., 1936, v. 19, Dec., p. 1132.)

Puglisi-Duranti, Giovanni. **Spindle pigmentation of the posterior surface of the cornea. (Krukenberg spindle.)** Saggi di Oft., 1934-36, v. 8. (See Amer. Jour. Ophth., 1936, v. 19, Jan., p. 64.)

Rados, A., and Rosenberg, L. C. **Relation between blue scleras and hyperparathyroidism.** Arch. of Ophth., 1936, v. 16, July, pp. 8-35.

The authors review the literature and report two cases of osteogenesis imperfecta with blue scleras in which careful studies of the serum calcium and of calcium metabolism were made. These did not show sufficient variations to in-

dicate relation to endocrine disturbance. The cases in which blue scleras are associated with proved parathyroid disorder are rare exceptions and are probably due to superimposition of hyperparathyroidism on a preëxistent congenital anomaly. J. Hewitt Judd.

Sanyal, Saradindu. **Keratoconjunctivitis with adenitis in Calcutta.** Amer. Jour. Ophth., 1936, v. 19, Nov., pp. 982-988.

Soloninkin, L. S. **The treatment of serpiginous ulcer with sodium bicarbonate.** Sovietskii Viestnik Opht., 1936, v. 9, pt. 1, p. 57.

This was an attempt to verify the favorable reports of Pellotti and Heiberger as to subconjunctival injections of sodium carbonate in corneal disease. The treatment was tried in 22 cases, with negative results. Ray K. Daily.

Strebel, J. **Xerophthalmia experimentally created in an infant suffering from allergic eczema. Vitamin-A therapy in affections of cornea and retina.** Klin. M. f. Augenh., 1936, v. 97, Sept., p. 394.

A child of five months suffering from itching eczema, so that it could not sleep, was ordered a fat-free diet. Two months later it was free from eczema but showed a wrinkled skin with diminished turgor and with corneal xerosis. In the foamy secretion at the angles of the lids numerous xerosis bacilli were found. The sensibility of the cornea was diminished and tension slightly decreased. Under fat milk, vogan, and carrot juice the skin turgor soon became normal and the cornea clear, but the allergic eczema returned in moderate form, so that fat-free milk had to be given. The vogan was discontinued, but the carrot juice was continued. This rapid cure of xerophthalmia was so striking that Strebel now treats corneal affections of protracted course with vitamin-A. It is logical also to order vitamin-A in affections of the retina.

C. Zimmermann.

Sugita, Y. **Disciform and ring-shaped corneal opacities, particularly Liesegang's phenomenon in the cornea.** Graefe's Arch., 1936, v. 136, p. 52.

Previous articles by the author have pointed out that disciform and ring-shaped opacities are to be explained on the same basis as Liesegang's phenomenon, the cornea acting as a colloidal membrane. When the galvanocautery is applied to the central part of the cornea of a live rabbit, so as to produce a round wound about 1.5 mm. in diameter, and then a corrosive agent such as sulphuric acid is applied only to the wound, there develops a symmetrical disciform opacity in the vicinity of the wound. Through centrifugal diffusion of the strong acid from the focus in the central part of the cornea, precipitated albumen and its cleavage products produce many concentric or Liesegang rings, characteristic of colloidal membranes. The clinical picture of disciform opacity is therefore due to the collection of Liesegang rings, composed chiefly of precipitated albumen. Clinically and histologically this disciform opacity produced experimentally in rabbits corresponds with that in human disciform keratitis. The ring-shaped or disciform corneal opacity in serpent ulcer, in aspergillus or actinomyces keratitis, in corneal foreign body, in the deposit of metals, and so on may likewise be referred to the production of Liesegang rings. H. D. Lamb.

Vranova-Provaznikova. **Antiluetic treatment in interstitial keratitis.** Ceskoslovenska Oft., 1935, v. 2, no. 3, pp. 194-198.

The author describes the treatment of interstitial keratitis with bismuth and various arsphenamin preparations, in conjunction with milk injections. The treatment usually results in return of vision. The disease, however, cannot be prevented from occurring in the other eye, or from recurring. The patients gain in weight, and there is improvement in general health.

G. D. Theobald.

Zentmayer, William. **Marginal dystrophy of the cornea associated with prolapse of the iris.** Arch. of Ophth., 1936, v. 16, July, pp. 91-94.

The author reviews the literature and reports the case of a woman, aged 52 years, who presented marginal dystrophy of the entire circumference of each cornea. The furrow was of uneven depth and in the right eye there was a prolapse of iris through its floor. The biomicroscopic findings are described and the condition illustrated by a photograph. J. Hewitt Judd.

7

UVEAL TRACT, SYMPATHETIC DISEASE AND AQUEOUS HUMOR

Aguilar, O. P., and Lijo Pavia, J. **Iridociliary and pulmonary tuberculosis.** Rev. Oto-Neuro-Oft., 1936, v. 11, May, p. 128.

The case reported is that of simultaneous appearance of acute manifestations in lungs and eyes of a boy of eleven years. Photomicrographs of enucleated eyes. M. Davidson.

Alonso, F. A. **Combined medical and surgical treatment of luetic iridocyclitis.** Rev. Cubana de Oto-Neuro-Oft., 1936, v. 5, May-June, p. 80.

In the presence of ocular lues mercury and bismuth should be given the preference over the arsenicals. In three cases paracentesis has been found of decided benefit; enhancing the value of, as well as eliminating the danger of hypertension from, atropinization.
M. Davidson.

Avalos, Enrique. **My third case of bilateral severe uveitis accompanied by deafness and by graying and falling out of hair.** Rev. Cubana Oto-Neuro-Oft., 1936, v. 5, May-June, p. 75.

A third case is described, with onset eleven years previously. The mechanism is believed analogous to that of sympathetic ophthalmia, the underlying cause being unknown. M. Davidson.

Biozzi, Giuseppe. **Circular folds in the posterior layer of the iris, a new slit-lamp finding**. Saggi di Oft., 1934-36, v. 8. (See Amer. Jour. Ophth., 1935, v. 18, Sept., p. 873.)

Biozzi, Giuseppe. **Contribution to histologic knowledge of Fuchs's heterochromia.** Saggi di Oft., 1934-36, v. 8. (See Amer. Jour. Ophth., 1936, v. 19, Dec., p. 1135.)

Biozzi, Giuseppe. **Observations and researches on Fuchs's heterochromia.** Saggi di Oft., 1934-36, v. 8. (See Amer. Jour. Ophth., 1936, v. 19, Aug., p. 730.)

Borsotti, Ippolito. **Contribution to the study of experimental oculotropism.** Boll. d'Ocul., 1936, v. 15, July, pp. 716-739.

Streptococci isolated from throat and gums of apparently sound persons, passed repeatedly through culture media of broth with fresh ox and calf uvea, and injected into fifty rabbits, did not acquire a real tropism for the eye. The writer discusses the appearance of ocular symptoms in some of the rabbits, and the interpretation of such cases. He is skeptical as to the theory of experimental organotropism. (Bibliography.)
M. Lombardo.

Ciotola, Guido. **The question of the selective power of the ciliary epithelium**. Boll. d'Ocul., 1936, v. 15, July, pp. 740-744.

The writer, injecting ascorbic acid endovenously in six aphakic rabbits, found that it passed in good amount from the blood into the aqueous humor. If the ciliary body was wounded by paracentesis the acid passed into the anterior chamber, although in less amount than in the aphakic eye with intact ciliary body. These experiences demonstrate that ascorbic acid can pass from the blood into the aqueous by active filtration, either because after injection the acid is found in greater amount than in the blood or because changes in the ciliary epithelium make passage more difficult. (Bibliography.)
M. Lombardo.

Grósz, Stephan. **Essential iris atrophy and glaucoma.** Arch. f. Augenh., 1936, v. 110, Sept., p. 111.

The characteristics of the disease, of which two case histories are given, are that it attacks mostly women, it is unilateral, and the pupil is eccentric; while in the atrophic grayish outer layer of the iris many defects of substance are

noted, bridged over by fine vessels. At the beginning the pigment layer is still visible, later it disappears forming a hole through which the fundus can be seen. The tension is increased and progresses to absolute glaucoma. The various theories of origin are discussed. The author believes we are dealing with a heredodegenerative process. The primary factor is an iris of inferior quality. The process may begin with atrophy in one portion of the iris, the healthy part exerting a pull on the atrophic portion until it becomes torn. The glaucoma is secondary. The pigment débris clogs the iris angle, and the surface of the iris also becomes smaller. The increased tension then aggravates the process. Or, as an alternate course, upon the weakly developed anterior layer of the iris persisting mesodermal bands shrink and draw upon the iris; and so close iris vessels and cause atrophy and lacerations. The treatment is that of glaucoma. R. Grunfeld.

Kotlarevskaja, S. Z., and Jufa, N. Z. **The pressure in the ciliary vessels of the normal and diseased eye studied by Seidel's method.** Sovietskii Viestnik Opht., 1936, v. 9, pt. 1, p. 14.

The author measured the systolic and diastolic pressure in the ciliary vessels of 156 normal and 61 diseased eyes, using Seidel's method. The tabulated findings show that the pressure in the ciliary vessels is remarkably constant, not being affected by general blood pressure, ocular tension, or ocular inflammation. It was found raised in eleven out of twenty cases of intraocular hemorrhage. The author believes that such an examination of preoperative cases may give some indication as to the probability of hemorrhagic complications. Ray K. Daily.

Ladekarl, P. M. **Hypotensive iritis in retinal detachment.** Acta Ophth., 1935, v. 13, pts. 3-4, p. 301. (See Section 10, Retina and vitreous.)

Ladekarl, P. M. **A large central coloboma of the choroid surrounding disc and macula.** Acta Ophth., 1935, v. 13, pts. 3-4, p. 296.

A description of a right macular coloboma of the choroid, 9 by 10 disc diameters in size, with considerable excavation and surrounding the disc. Vision was 6/60 and fixation eccentric.
Ray K. Daily.

Levina, L. C. **Rheumatic iritis and its treatment with lysates.** Sovietskii Viestnik Opht., 1936, v. 9, pt. 1, p. 22.

A tabulated report of 26 cases treated with lysates or a combination of lysates and salicylates, with satisfactory results. The author regards rheumatic iritis and also iritis of unknown etiology as allergic manifestations.
Ray K. Daily.

Lijo Pavia, J., and Yrigoyen, L. **Macronodular iridociliary tuberculosis with panophthalmic dissemination.** Rev. Oto-Neuro-Oft., 1936, v. 11, July, p. 185. (See Aguilar and Lijo Pavia above.)

Motolese, Francesco. **Metastatic ophthalmitis from rheumatic peliosis.** Boll. d'Ocul., 1936, v. 15, July, pp. 711-715.

The history is given of a girl eleven months old affected by hemorrhagic patches on the extensor side of each lower limb which were very painful to touch. This hemorrhagic peliosis was complicated by symptoms of acute left iritis, with hypopyon and pupillary occlusion. A few days after the first examination the eye showed a tumefaction of the size and shape of a small almond, which started at the equator and covered the whole cornea anteriorly. This was an abscess of Tenon's cavity, and it opened spontaneously. When last seen the eye was atrophic. The writer emphasizes the simultaneous occurrence of suppurative metastasis to the uveal tract and to Tenon's capsule. M. Lombardo.

Ollendorff, Ulrich. **A case of immobility of the pupils with preserved lid-closure phenomenon, cyclitis, and hypertension.** Klin. M. f. Augenh., 1936, v. 97, Sept., p. 389.

These conditions were observed in a man of 45 years. The pupillary disturbance is explained by the probability

that innervation of the lid-closure reflex runs in a path separated from the stem and nucleus of the oculomoter nerve. C. Zimmermann.

Puglisi-Duranti, Giovanni. **Mydriasis and absolute pupillary rigidity in two brothers with heriditary lues.** Saggi di Oft., 1934-36, v. 8. (See Amer. Jour. Ophth., 1935. v. 18, Aug., p. 792.)

Puglisi-Duranti, Giovanni. **Typical colobomata of the choroid and colobomata of the macular region.** Saggi di Oft., 1934-36 v. 8. (See Amer. Jour. Ophth., 1936, v. 19, March, p. 268.)

Rosengren, Bengt. **Is sympathetic ophthalmia an exogenous or endogeneous infection?** Acta Ophth., 1936, v. 14, pts. 1-2, p. 126.

From histologic study of the eye with sympathetic ophthalmia the author concludes that the infection was exogenous. Ray K. Daily

Salus, R. **Rosacea lesions of the iris.** Med. Klin., 1936, v. 32, June 26, pp. 865-866.

A new picture of iris involvement was found in four of twelve patients with roscacea keratitis.

It consists of groups of bright red, circumscribed convolutions of very small blood vessels, always situated in the ciliary portion of the iris and sometimes forming small nodules. A mild iritis may accompany these lesions. They have not been found in eyes of rosacea patients without corneal involvement, and they usually disappear soon after atropin therapy is started. They are probably manifestations of the general readiness of the capillaries of such patients to respond to irritations of various kinds with new formation of blood vessels and teleangiectasia. The corneal involvement is the source of irritation for the iris.

Bertha Klien.

Tome y Bona, J. M. **Iris and pupil pathology in syphilis.** Rev. Cubana de Oto-Neuro-Oft., 1936, v. 5, May-June, p. 89.

In reviewing the subject, the author arrives at the conclusion that pupillary inequality without reflex disturbances is not significant, and that a complete Argyll Robertson is pathognomonic of tabes, an incomplete one indicating rather general paresis in evolution.

M. Davidson.

8

GLAUCOMA AND OCULAR TENSION

Anthonisen, Harald. **The frequency of diabetic cataract and diabetic glaucoma as compared to the frequency of diabetes in the general population of Denmark.** Acta Ophth., 1936, v. 14, pts. 1-2, p. 150. (See Section 9, Crystalline lens.)

Barkan, Otto. **A new operation for chronic glaucoma.** Amer. Jour. Ophth., 1936, v. 19, Nov., pp. 951-965.

Chiazzaro, D. **On absorption of metallic magnesium in the human eye.** Ann. d'Ocul., 1936, v. 173, Sept., pp. 689-702.

Magnesium embedded in ocular tissues slowly dissolves with liberation of hydrogen but very little inflammatory reaction. Absorption takes place much more rapidly in the anterior chamber or vitreous than subconjunctivally. Use has been made of the absorbability of magnesium in surgical treatment of glaucoma. During the Elliot trephining a ribbon of magnesium is introduced into the anterior chamber through the trephine wound and brought out subconjunctivally. The presence of the foreign body and the gradual liberation of hydrogen tends to keep the drainage tract open and to elevate the conjunctiva, thereby producing a good filtering bleb. On three eyes in two individuals this gave very satisfactory results.

John C. Long.

Friedenwald, J. S. **Circulation of the aqueous. 5. Mechanism of Schlemm's canal.** Arch. of Ophth., 1936, v. 16, July, pp. 65-77.

Studies of serial sections show that Schlemm's canal is not connected with

the anterior chamber by any open channels but with the intrascleral vascular plexus at the limbus by both afferent arterioles and efferent venules. The venules are about four times as numerous as the arterioles, as is clearly demonstrated by schematic drawings and photomicrographs. Since a reduction in the flow of plasma into the canal would cause a decrease in the rate of absorption of the aqueous with subsequent rise in intraocular tension, it is suggested that the sclerotic changes in the afferent arterioles found in cases of glaucoma may be the primary lesions.

J. Hewitt Judd.

Gallois, Jean, and Viard, P. **Eighteen months' experience in glaucoma therapy with a calcium-magnesium compound.** Bull. Soc. Franç. d'Opht., 1935, v. 48, pp. 439-444.

The authors have treated a number of cases of different types of glaucoma with a mixture of calcium chloride and magnesium hyposulphite, injected intravenously. The mixture has been introduced as an antispasmodic. Definite value is not proved but the mixture may be of some value in chronic simple glaucoma. It is contraindicated in acute and secondary types.

P. J. Leinfelder.

Grosz, Stephan. **Essential iris atrophy and glaucoma.** Arch. f. Augenh., 1936, v. 110, Sept., p. 111. (See Section 7, Uveal tract, sympathetic disease, and aqueous humor.)

Holmström, Johan. **Posterior sclerotomy in glaucoma.** Acta Ophth., 1936, v. 14, pts. 1-2, p. 259.

The author believes that the now rarely used posterior sclerotomy has definite indications, and reports a case of acute fulminating glaucoma in which posterior sclerotomy was followed by restoration to normal and later permitted performance of iridectomy under favorable conditions. Ray K. Daily.

Hörven, E. **How frequently does exfoliation of the anterior lens capsule occur in simple glaucoma?** Acta Ophth., 1936, v. 14, pts. 1-2, p. 231.

The author examined with the slit-lamp 34 eyes enucleated for glaucoma, after cutting away cornea and iris and exposing the lens. Exfoliation of the lens capsule was found in 24 eyes. This phenomenon was also found in 85 percent of 150 patients operated on by iridencleisis and in 93 percent of 43 nonoperative glaucoma cases. Of 67 inmates of an old folks' home, without glaucoma, two had capsular exfoliation, and in 54 eyes removed from cadavers capsular exfoliation was found once. In 85 clinic patients without glaucoma, of whom 55 had cataract, 17.6 percent had exfoliation of the capsule. The author feels that these statistics indicate clearly the significance of capsular exfoliation in glaucoma. (Illustrations.)

Ray K. Daily.

James, W. M., and Siefker, A. J. **Observations on the reducing substances (glucose) of the aqueous and vitreous humors of the eye.** Amer. Jour. Ophth., 1936, v. 19, Nov., pp. 975-981.

Kreibig, Wilhelm. **Roentgen therapy in absolute glaucoma.** Wiener klin. Woch., 1936, v. 49, July 3, pp. 843-845.

The majority of painful eyes with absolute glaucoma, either primary or secondary, may be rendered painless by treatment with roentgen rays. The treatment may consist of application of one large dose up to 800 r, or a succession of small doses, 50 r given three times two or three days apart, then after an interval of three or four weeks another period of three applications, up to ten or twelve small doses.

The painlessness is brought about not by decrease in intraocular tension (which often does not change appreciably) but by decreased sensibility of the eye. The roentgen rays therefore act mainly upon the sensory nervous apparatus of the eye. Success or failure of this therapy in the individual case cannot be predicted, but in most eyes it has the desired effect. Thus it has become a routine procedure in the first eye clinic of Vienna. Bertha Klien.

Merkulow, I., and Minkin, S. **The question of the relationship between**

intracranial and intraocular pressure. Zeit. f. Augenh., 1936, v. 90, Sept., p. 18.

To throw light on the question of a possible relationship between intracranial and intraocular pressure, the author used two patients experimentally. One of the patients with brain tumor had developed a slight but constant flow of spinal fluid from the nose so that it was impossible to develop increased intracranial pressure. The other patient had a cyst in one lateral ventricle. After trephining it was possible safely to introduce a needle into the lateral ventricle and measure increases of pressure manometrically. These patients were given intravenous injections of 1 c.c. each of adrenalin 1 to 1000 solution, 1 to 100 pilocarpin, and 1 to 1000 atropin with 40 c.c. of distilled water, and 40 c.c. of 40 percent hypertonic solution. The intraocular pressure was measured during the first two hours after the injection, as was the intracranial pressure of the second patient. The intraocular pressure behaved similarly in the two patients, while the intracranial pressure of one of them could not be influenced at all.

The author concludes that intracranial and intraocular pressure are not interdependent. This conclusion is open to an objection that possible effect of the intracranial tension on the intraocular is quantitively so slight that it is veiled by greater direct effect on intraocular pressure of the drugs injected. As a control, three patients were used who had hydrocephalus and for whom encephalography and ventriculography had been ordered for diagnostic reasons. In them, increased intracranial pressure could be induced by oxygen administration instead of an indifferent fluid to replace the spinal fluid which had been removed. This has the advantage that it does not produce all the signs of commotio cerebri as does the introduction of fluid. In one patient it was possible to produce an increase of pressure only in the ventricles, in a second only in the subarachnoid space, and in the third in both situations. In none could any relationship between intracranial and intraocular pressure be noted. F. Herbert Haessler.

Nyquist, B. **Recording the effects of drugs in inflammatory glaucoma.** Acta Ophth., 1935, v. 13, pts. 3-4, p. 256.

At the ophthalmologic service in the Municipal Hospital in Oslo the effect of drugs on ocular tension is recorded graphically, and the author points out the value of such graphs.

Ray K. Daily.

Skydsgaard, Henning. **Unilateral nevus flammeus of the face associated with homolateral glaucoma.** Acta Ophth., 1935, v. 13, pts. 3-4, p. 273.

A comprehensive review of the literature and report of a case in a fourteen-year-old boy. Ocular symptoms appeared at the age of nine years, and in spite of continued surgical and medical treatment the initial vision of 6/15 could not be held nor the field contraction arrested. In spite of the early age at which glaucoma set in there was no buphthalmos. The author urges prophylactic tonometry and roentgenography of the skull in all cases with extensive facial nevus. (Illustration.) Ray K. Daily.

Weeks, W. W. **Ocular hypertension in glaucoma.** Jour. Amer. Med. Assoc., 1936, v. 107, Sept. 5, p. 774.

The author discusses errors in operative technique. The causes of failure appear to be (1) a well advanced ocular pathology at the time of operation; (2) faulty choice of operative procedure, in view of the tissue changes present; and (3) definite errors in operative technique and after-care. (Discussion.)

G. H. Stine.

Wittels, Ludwig. **Investigations on the tension of the enucleated glaucomatous eye.** Klin. M. f. Augenh., 1936, v. 97, Sept., p. 370.

Tonometric examinations of enucleated glaucomatous eyes confirmed the often made observation that these eyes remain hard even after enucleation. In agreement with experiments on eyes with normal tension the decrease of pressure after enucleation is about two-thirds, the residuary pressure one-third of the initial tension. The decrease is

caused by loss of blood in the intraocular vessels. The residual tension of the glaucomatous eye is to be attributed to augmented volume of the ocular contents of still unknown nature.

C. Zimmermann.

9

CRYSTALLINE LENS

Anthonisen, Harald. **The frequency of diabetic cataract and diabetic glaucoma as compared to the frequency of diabetes in the general population of Denmark.** Acta Ophth., 1936, v. 14, pts. 1-2, p. 150.

Mathematical analysis of a large series of cataract cases leads the author to conclude that advanced cataracts in diabetes are not merely senile cataracts, but are complications of the disease. The small number of glaucoma cases does not permit the drawing of conclusions. Ray K. Daily.

Bahr, Gunnar von. **Experimental studies on zonular cataract, and its relation to rickets and tetany.** Acta Ophth., 1936, v. 14, pts. 1-2, p. 205.

Tabulated report of an experimental study on rats shows that in rachitic rats an increased irritability, as measured by the galvanic response and produced by dietetic changes, may cause lenticular opacities. Ray K. Daily.

Bellows, John. **Biochemistry of the lens. 7. Some studies on vitamin C and the lens.** Arch. of Ophth., 1936, v. 16, July, pp. 58-64.

Experimental data indicate that the antioxidative action of the lens on vitamin C does not depend on its content of glutathione, but must depend on some other factor present in lens tissue. This action explains the absence of the reduced form of vitamin C in the aqueous of the aphakic eye, and the presence of only small amounts of the reversibly oxidized form. No satisfactory evidence has been reported that would indicate an effect of vitamin C on the progress of cataract.

J. Hewitt Judd.

Bellows, J., and Rosner, L. **Biochemistry of the lens. 8. A new proof of the presence of vitamin C in the crystalline lens.** Arch. of Ophth., 1936, v. 16, Aug., pp. 248-251.

A powerful enzyme which oxidizes vitamin C was found in an extract from the Hubbard squash. The reducing substance in the lens and aqueous is entirely oxidized by the enzyme. The authors conclude that the reduction is entirely due to vitamin C, and that this offers new proof of the latter's presence in lens and aqueous. J. Hewitt Judd.

Broman, Tore. **On the occurrence of iritis after the extraction of a cataract.** Acta Ophth., 1936, v. 14, pts. 1-2, p. 170.

Of 650 combined extractions 17 percent had a frank postoperative iritis, and 31 percent mild iridic irritation. Graphic charts illustrate the significance of age, sex, sedimentation rate, and season on the complication. They show that neither age nor high sedimentation rate has any influence. Women are more frequently affected than men, and the disease occurs most frequently in winter. Ray K. Daily.

Caramazza, Filippo. **Biomicroscopy of the vitreous in aphakia.** Saggi di Oft., 1934-36, v. 8. (See Amer. Jour. Ophth., 1935, v. 18, July, p. 672.)

Esteban, M. **The first dressing after cataract extraction.** Rev. Cubana de Oto-Neuro-Oft., 1936, v. 5, March-April, p. 67.

To facilitate very gentle opening of the eyes by the patient himself with the least shock and violence, he is asked to open his mouth at the same time. Functional synergy between mouth and lid movements, perhaps related to the Marcus Gunn phenomenon, explains the maneuver. M. Davidson.

Gjessing, G. A. **Continued investigations about a possible relationship of antagonism between cataract and Haab's senile macula alterations.** Acta Ophth., 1936, v. 14, pts. 1-2, p. 134.

A mathematically interpreted study of 6,323 eyes for lenticular opacities and central fundus changes shows that to some extent lens opacities form a bar-

rier to development of senile macular degenerations. Ray K. Daily.

Grönholm, V., and Kangasniemi, M. **Corneal suture in cataract extraction and postoperative astigmatism.** Acta Ophth., 1936, v. 14, pts. 1-2, p. 158.

The objective of the study was to determine what type of suture produced the least postoperative astigmatism. Of 171 extractions, 74 were without and 65 with suture and 32 with two corneoscleral sutures. The conclusions are that two corneoscleral sutures afford the most accurate apposition of the lips of the wound and result in the least postoperative astigmatism. (Illustrations.) Ray K. Daily.

Hill, H. **Cataract formation occurring following the use of dinitrophenol.** Jour. Indiana State Med. Assoc., 1936, v. 29, Feb., p. 67.

Hill reports on a 36-year-old woman in whom a cataract formed after use of the drug. There was an interval of one year from the time the drug was discontinued and the onset of symptoms, but only eight weeks from the onset of symptoms to blindness.

Theodore M. Shapiro.

Höeg, N. **Fixation of the globe by means of a conjunctival suture.** Acta Ophth., 1936, v. 14, pts. 1-2, p. 168.

The author introduces an untied 3 mm. long conjunctival suture at the limbus and grasps this suture along with the conjunctiva. He believes that this suture makes forceps fixation more secure. Ray K. Daily.

Hofe, K. vom. **Vocational fitness of those who had been operated upon in their youth for congenital cataract.** Arch. f. Augenh., 1936, v. 110, Sept., p. 34.

The author points out that investigations carried on at different sources unanimously demonstrate that persons operated on in youth for bilateral cataract gain useful vision and are able to follow gainful vocations.

R. Grunfeld.

Hörven, E. **How frequently does exfoliation of the anterior lens capsule occur in simple glaucoma?** Acta Ophth., 1936, v. 14, pts. 1-2, p. 231. (See Section 8, Glaucoma and ocular tension.)

Kirby, D. B. **A technique for intracapsular extraction of cataract.** Amer. Jour. Ophth., 1936, v. 19, Nov., p. 1006.

Kugelberg, I. **Tetany and cataract.** Acta Ophth., 1936, v. 14, pts. 1-2, p. 220.

The author examined the lenses of 142 people between four and eighteen years of age who had been treated for tetany, and of 101 normal children between seven and fourteen years of age. Of the 142 with a history of tetany, 30 percent had zonular lenticular opacities. The series of 101 normal children did not show one case of cataract. These findings confirm the view that tetany caused by infantile parathyroid deficiency is the etiologic factor in zonular cataract. Of the pathologic cases, 57 percent had enamel hypoplasia of the teeth, and 35 percent of 80 patients with this dental malformation had zonular opacities. This is in accordance with Berg's findings published in 1919.

Ray K. Daily.

Lugli, Luigi. **Late traumatic rosette cataract.** Saggi di Oft., 1934-36, v. 8. (See Amer. Jour. Ophth., 1936, v. 19, Feb., p. 182.)

Müller, H. K. **The dependence upon age of how much phosphoric-acid ester of the lens can be hydrolized with ease or with difficulty.** Arch. f. Augenh., 1936, v. 110, Sept., p. 128.

The acid-soluble phosphoric-acid ester of the lens was hydrolized according to the method of Lohmann and thus split into an organic residue and inorganic phosphoric acid. According to age the lens contains a variable amount of phosphoric-acid ester hydrolizable easily or with difficulty. The amount of ester which hydrolizes with ease does not change with age, but that which hydrolizes with difficulty diminishes considerably, even up to thirty percent. This finding gains in importance from the observations that make it probable that the lens may produce vitamin C

from the phosphoric-acid ester which diminishes most with age. Yet this ester may not be the only material from which vitamin C is formed.

R. Grunfeld.

Müller, H. K. **Is a medicamentous therapy of senile cataract thinkable?** Klin. M. f. Augenh., 1936, v. 97, Sept., p. 304.

Anatomically and physiologically the lens is to be regarded as an independent entity, its relations to surroundings being almost exclusively confined to the aqueous. It takes in albumen, disintegrates it, and converts it into lenticular albumen proper. Changes in the vitamin-C content of the aqueous influence that of the lens and vice versa. Our knowledge of the metabolism of the lens must be essentially broadened. If we learn which special features of the lenticular metabolism most easily threaten to fail in senile cataract, we may look for appropriate remedies. This conception of senile cataract shows that the search for a single cataract remedy must be useless. But, senile cataract being recognized as a mere phenomenon of senescence of the lens, investigation of the physico-chemical changes of the senescent lens may lead to successful medicinal treatment of senile cataract.

C. Zimmermann.

Pereira, R. F. **Prolapse of vitreous into the anterior chamber, and glaucoma following intracapsular cataract extraction.** Arch. de Oft. de Buenos Aires, 1936, v. 11, July, p. 409.

Two new cases are reported. The prolapse resulted from physical exertion in one, and from spontaneous dilatation of the pupil in the other. The hypertension is due to strangulation of the hernia by the contracted sphincter, and Urbanek's recommendation to reestablish communication between the anterior and posterior chambers by iris transfixion is mentioned with approval. One eye was lost in spite of it.

M. Davidson.

Salit, P. W. **Phospholipid content of cataractous and sclerosed human lenses.** Arch. of Ophth., 1936, v. 16, Aug., pp. 271-283.

This is approximately a repetition and confirmation of the experiments and results described in a previous article. (See Amer. Jour. Ophth., 1936, v. 19, p. 271.)

Schwartz, V. J. **Unusual cataract complication forty years after operation.** Amer. Jour. Ophth., 1936, v. 19, Nov., pp. 1006-1007.

10

RETINA AND VITREOUS

Allen, T. D. **Failures and successes in the operative treatment of detachment of the retina.** Amer. Jour. Ophth., 1936, v. 19, Nov., pp. 1000-1004.

Anthonisen, Harald. **Retinal periphlebitis.** Acta Ophth., 1935, v. 13, pts. 3-4, p. 289.

A 39-year-old man with cancer of the stomach suffered loss of vision in the left eye without external inflammatory phenomena. He had an intense papilloretinitis with tremendous swelling of the disc, and white exudate and hemorrhage in the fovea. The veins were dilated and tortuous, and their walls showed broad dirty-white infiltrations. Hemorrhages followed the veins to spread out at arteriovenous crossings. The arteries were normal. The author believes that the pathology consisted chiefly in imbibition and infiltration of the perivascular lymph spaces.

Ray K. Daily.

Brown, R. **The etiology of diabetic retinitis and its relation to vascular and renal disease.** Klin. Woch., 1936, v. 15, Aug. 22, pp. 1198-1202.

In 111 out of 700 diabetic patients ophthalmoscopic examination revealed a retinopathy. Careful search for a coexisting arteriosclerosis, ophthalmoscopically visible, was negative in 88 of these 111 patients. A 23-year-old girl with severe diabetes mellitus developed bilateral retinopathy with extensive hemorrhages and secondary glaucoma

in one of the eyes, which finally had to be enucleated. In addition to the severe diabetic symptoms (blood sugar rarely under 250 mg. per 100 gm., constant sugar in urine in spite of insulin doses as high as 104 units), there were signs of a chronic nephritic process (increased blood nitrogen, hyalin and granular casts, and albumen in urine). The blood pressure was always normal. The author assumes that in this particular case the combination of the otherwise independent nephritic and diabetic conditions led to development of the fundus lesions. The problem of the origin of the diabetic retinopathy is very complex, and careful attention should be paid not only to the ocular but also to the general findings, such as height and variability of the blood sugar, ketonuria, potassium-calcium balance in the blood, and blood pressure. Bertha Klien.

Bunge, E. **Total color-blindness, hemeralopia, tapetoretinal degeneration in two sisters.** Klin. M. f. Augenh., 1936, v. 97, Aug., p. 243. (See Section 3, Physiologic optics, refraction, and color vision.)

Caramazza, Filippo. **Septic neuroretinitis from hemolytic streptococcus.** Saggi di Oft., 1934-36, v. 8. (See Amer. Jour. Ophth., 1935, v. 18, July, p. 676.)

Caramazza, Filippo. **Treatment of retinal detachment by diathermocoagulation.** Saggi di Oft., 1934-36, v. 8. (See Amer. Jour. Ophth., 1935, v. 18, July, p. 676.)

Charpentier, G. **The electrical retinal responses of normal and hemeralopic (vitamin-A-deficient) rats.** Acta Ophth., 1936, v. 14, pts. 1-2, p. 25.

A brief summary of the author's "The electroretinogram of normal and hemeralopic rats." (See below.)

Ray K. Daily.

Charpentier, G. **The electroretinogram of normal and hemeralopic rats.** Acta Ophth., Supplement 9, 1936, v. 14.

The objective of this investigation was to determine whether the hemeralopia due to A-avitaminosis is caused by a defect in regenerative capacity or by diminution in the total quantity of the visual purple. The studies were made on seventeen rats with experimental hemeralopia and on ten control rats in light adaptation and after various intervals of dark adaptation.

The retina of the rat consists predominantly of rods and is similar to the periphery of the human retina. The retina of the albino rat permits a study of the electrical reactions of rods free from visual purple. The tabulated study shows that in complete light adaptation no electroretinogram can be obtained by the continued or by the flicker method. The electroretinogram begins to reappear after one half hour of dark adaptation. The response of the dark adapted eye to the flicker as shown on the electroretinogram corresponds to the positive excitation elements of the retina. The behavior of the rat's eye is similar to that described by Granit in the cat's eye. A rod retina without visual purple is therefore a useless organ unable to initiate the processes registered in an electroretinogram. The visual purple may be regarded as the activator of the rod reaction, which is photochemically identified with absorption of visual purple. The rod retina becomes blind when the visual purple disappears. Complete disappearance of the electroretinogram in the rat after daylight adaptation shows that the negative element of the retinogram corresponding to cone activities was also eliminated by the action of rods. From the standpoint of ability to distinguish between light and dark the rat is shown electrophysiologically to be a night animal. The findings support Granit's claim that the excitation element of the retinogram registers the activity of the rods.

It appears that the b-process of the electroretinogram is an indicator of the quantity of visual purple which the retina possesses in various stages of adaptation. The shortened b-process in experimental hemeralopic rats indicates that the regeneration of visual purple is delayed. The total quantity of visual purple produced after twenty hours of

dark adaptation is smaller as compared with normal control rats. Thus it is probable that the hemeralope is also incapable of producing the normal quantity of visual purple. The b-process of the electroretinogram may therefore be considered the indicator of the degree of A-avitaminosis. Ray K. Daily.

Cockayne, E. A. **Dwarfism with retinal atrophy.** Arch. of Dis. in Childhood, 1936, v. 11, Feb., p. 1.

Two dwarfs, an eight-year-old girl and a six-year-old boy, had waxy atrophy of the discs and retinal atrophy. The cases are differentiated from congenital luetic atrophy by the character and distribution of the retinal-pigment scatterings. The macular reflexes are absent, the arteries are very narrow, but the veins are unaffected. Tests for visual acuity and fields were impossible.
Theodore M. Shapira.

Dymling, O. **Three cases of disturbed retinal circulation.** Acta Ophth., 1936, v. 14, pts. 1-2, p. 255.

A report of one case of embolism of the inferior branch of the central retinal artery, and two cases of spasm of the central retinal artery. The case of embolus recovered normal vision after paracentesis and the other two after the use of vasodilators. Ray K. Daily.

Filippi-Gabardi, Eugenio. **Occlusion of the central retinal artery.** Saggi di Oft., 1934-36, v. 8. (See Amer. Jour. Ophth., 1935, v. 18, Nov., p. 1067.)

Gjessing, G. A. H. **Continued investigations about a possible relationship of antagonism between cataract and Haab's senile macula alterations.** Acta Ophth., 1936, v. 14, pts. 1-2, p. 134. (See Section 9, Crystalline lens.)

Goldman, Hans. **A simple instrument for exact localization of retinal holes.** Klin. M. f. Augenh., 1936, v. 97, Aug., p. 251.

The principle of the instrument here described and illustrated consists in placing a small lamp with a diaphragm of 0.8 mm. directly on that part of the sclera corresponding to the probable site of the hole and observing its light in the inverted ophthalmoscopic image of the hole. (Illustrated.)
C. Zimmermann.

Horniker, E. **The genesis and significance of Gunn's sign.** Klin. M. f. Augenh., 1936, v. 97, Sept., p. 315.

Gunn's sign, the indentation of the retinal vein by the artery crossing it, has from its first description been the subject of careful consideration, but the interpretation of its significance is still controversial. After a brief introduction as to his oscillometric methods, the author directs attention to the fact that pulsatory phenomena in the retinal vessels may be observed not only with magnifying ophthalmoscopes but also with the electric hand ophthalmoscope. Attention is called to certain displacements of the retinal vessels and some streaks accompanying the arteries which are interpreted as sequels.
C. Zimmermann.

Jensen, V. A. **Studies on the branchings of the retinal blood vessels.** Acta Ophth., 1936, v. 14, pts. 1-2, p. 100.

Drawings and analysis of one hundred normal fundi show that the general tendency of the organism towards symmetry holds good also for the distribution of the retinal vessels. The greatest number of vascular crossings is found in the upper temporal quadrant and the smallest number in the upper nasal quadrant. In 70 percent of crossings the artery is in front of the vein. In 73 percent of the eyes the macular region was supplied by macular arteries and by branches from the temporal arteries. Ray K. Daily.

Kitahara, Sakae. **Clinical observations of serous central chorioretinitis, frequent in Japan.** Klin. M. f. Augenh., 1936, v. 97, Sept., p. 345.

The characteristic changes consist in circumscribed sharply defined edema of the retina from serous exudation between retina and choroid. It causes visual disturbance, micropsia, and metamorphopsia. Frequently a yellowish

grayish-white spot occurs in the center, and later innumerable grayish-white dots are scattered over this. In the further course the edema gravitates downward. The ophthalmoscopic appearance resembles that of a solitary tubercle of the choroid, but does not show the tumor-like tubercle in the center. The affection arises mostly in the macular region, but not rarely outside of it. The prognosis is favorable. The retinal edema is usually absorbed, but there is an inclination to repeated relapse. Men of middle age are frequently affected. The condition appears to be of tuberculous etiology. The disease is frequent in Japan, but seems to occur less frequently in Europe and America, judging by similar clinical appearances described in the literature. (Illustrated.) C. Zimmermann.

Kukan, Franz. **Relations of the vascular pressure of the retina to intracranial pressure, examined with the author's apparatus.** Klin. M. f. Augenh., 1936, v. 97, Sept., p. 331.

A far-reaching parallelism exists between retinal venous and cerebrospinal pressure. In every case in which the retinal venous pressure indicated a higher cerebrospinal pressure, lumbar puncture showed higher intracranial pressure. The author's new ophthalmodynamometer proved very convenient and reliable in these researches.

C. Zimmermann.

Ladekarl, P. M. **Hypotensive iritis in retinal detachment.** Acta Ophth., 1935, v. 13, pts. 3-4, p. 301.

The author reports two cases. The total number reported in the literature is under twenty. Both of the author's patients were myopes with retinal detachment, and the acute inflammatory iritis with hypotony set in subsequently to the operative procedures for retinal detachment. The prognosis of such cases is uncertain. In some cases the inflammatory symptoms subside rapidly but in others the deep anterior chamber and hypotony persist for months. The outstanding feature of the disease is the marked hypotony, on which some observers have diagnosed rupture of a posterior staphyloma. The other symptoms are severe pains localized in the eyeball, dilated pupil, green discoloration of the iris, and a homogeneous cloudiness of the anterior chamber. The pathogenesis of the condition has not been demonstrated. (Illustration.) Ray K. Daily.

Maggiore, Luigi. **The diathermy treatment for retinal detachment.** Ann. di Ottal., 1936, v. 64, June, p. 361.

Maggiore considers not only the cases most suitable for treatment but those that from the beginning appear inoperable. Several complicated cases are detailed. The diathermic method has a simple and effective technique and gives a high percentage of cures (60 to 70 percent). When the Gonin method is inapplicable because of destruction of the retinal tissues, multiplicity of tears, or the extent of detachment, reattachment can be secured by single or multiple micropuncture without destruction of adjacent tissues. Cases that seem to warrant a good prognosis sometimes result in failure and cases that apparently offer little hope of betterment may give surprisingly good results. A limited number of cases will recover under medical care alone.

Park Lewis.

Mattos, B. W. **Familial luetic macular lesions.** Rev. Oto-Neuro-Oft., 1936, v. 11, July, p. 181.

A study of the fundus lesions in question, all undoubtedly of luetic origin, brings out the difficulty of making, on the basis of the ophthalmoscopic picture alone, a differential diagnosis between heredoluetic retinal degeneration, disseminated chorioretinal atrophy, proliferating external retinitis, and cicatricial exudative retinitis; and also between them and lesions due to injury, focal infection, and tuberculosis.

M. Davidson.

Meisner, W. **The occurrence and origin of retinal detachment.** Klin. M. f. Augenh., 1936, v. 97, Sept., p. 289.

This discourse is based on exact rec-

ords of 180 eyes with detachment of the retina observed at the eye clinic of the University of Cologne from 1932 to 1935. The detachments can be attributed to perforating lesions and contusions of the eyeball. Generally they show holes at the site of the injury or by cicatricial retraction near it. While recent, the ruptures or detachments mostly lie temporally or temporally and downward. The duration of their existence cannot safely be inferred from the magnitude of the detachment. The size of the rupture and the condition of the vitreous must be considered. A considerable interval without symptoms does not absolutely speak against the connection. Indirect traumas, such as violent concussions of the body, may cause detachment, especially in predisposed persons (myopes, or older persons). Myopes with the peak of frequency between thirty and fifty years of age, and persons above fifty years, especially incline to detachment. The danger increases with the height of myopia. Emmetropic cases under fifty years present two groups: (a) those with spontaneous rupture of the ora temporally and downward; (b) so-called inflammatory detachments, in which tuberculosis plays a part.

C. Zimmermann.

Pletneva, N. A. **The diagnostic and prognostic value of examination of the ocular vessels in hypertension.** Sovietskii Viestnik Opht., 1936, v. 9, pt. 1, p. 3.

The author points out that the capillaries of the limbus and the vessels of the fundus are indicative of the condition of the peripheral vascular system and should be made a part of the routine examination in hypertension.

Ray K. Daily.

Puglisi-Duranti, Giovanni. **Lesions from diathermocoagulation in the vitreous.** Saggi di Oft., 1934-36, v. 8. (See Amer. Jour. Ophth., 1936, v. 19, Jan., p. 71.)

Ramach, Friedrich. **Report of cases of retinal detachment operated on in the second University Eye Clinic in Vienna during 1932, 1933, and 1934.** Graefe's Arch., 1936, v. 136, p. 78.

In all, 150 patients and 154 eyes were operated on because of retinal detachment. For fourteen, or 18.7 percent, of the patients who obtained subsequent reattachment, follow-up could not be carried out. In the remainder of these patients the subsequent condition of the eye was ascertained for from 18 months to two years after operation. On the 154 eyes 271 operations were performed as follows: one operation on each of 88, 2 operations on 36, 3 on 16, 4 on 9, 5 on 3, and 6 on 2.

Of the 154 eyes, 75, or 48.7 percent, obtained reattachment. In the same three years, 173 more eyes with retinal detachment were operated on in Lindner's private practice. Of these reattachment occurred in 88, or 50.9 percent.

H. D. Lamb.

Rubbrecht, R. **Technique of suture of the retina.** Bull. Soc. Franç. d'Opht., 1935, v. 48, pp. 394-398.

The operation depends for success upon use of the proper needle and correct location of the sutures. The author uses a sharp-pointed, oval, curved needle 20 mm. long. Two sutures of no. 0 black silk are placed in the region of first appearance of the detachment, and the presence of tears is disregarded. The sutures are usually placed in an equatorial direction, the posterior one first, and care is exercised that all the coats of the eye are perforated. To facilitate the passage of the needle the sclera is incised with a knife at the site of perforation. The threads are brought through the conjunctiva and tied. The patient wears a binocular bandage for two days, after which stenopeic glasses are given. The sutures are removed after three days.

P. J. Leinfelder.

Schwartz, L. H. **Cyst of the vitreous attached to the retina.** Arch. of Ophth., 1936, v. 16, Aug., pp. 230-235.

The author reviews the literature and reports the case of a youth aged seventeen years, who presented in the fundus of the right eye a translucent bluish-white swelling of about 5.5 diopters

elevation, located directly below the papilla. The surface was slightly pitted, unpigmented, and the mass did not move about in the vitreous. It was adherent to the retina and the central retinal vessels. (Fundus photograph.)

J. Hewitt Judd.

Shankara Menon, K. C. **Occlusion of the central artery of the retina.** Proc. All-India Ophth. Soc., 1935, v. 4, pp. 184-186.

Of this condition only 5 cases had been seen previously in the hospital in twenty years. In the author's patient, aged 40 years, seen with a left blindness of 24 hours duration, the typical cherry-red spot surrounded by an anemic area, slight disc swelling, and some perivascular sheathing on both sides of the arteries immediately after their exit from the disc were the only findings. There was a history of a previous cardiovascular trouble and a collapsing pulse, and a fusiform aneurism of the ascending and transverse aorta also involved the aortic ring. There was no history of syphilis in the patient or his wife. The retinal arteries regained their circulation, but no vision returned. Permanent retinal changes are produced by complete obstruction lasting only 45 minutes. Treatment with vasodilators, massage, and paracentesis is discussed.

Lawrence G. Dunlap.

Strebel, J. **Xerophthalmia experimentally created in an infant suffering from allergic eczema. Vitamin-A therapy in affections of cornea and retina.** Klin. M. f. Augenh., 1936, v. 97, Sept., p. 394. (See Section 6, Cornea and sclera.)

Weve, H. **Diathermic treatment of giant holes in the retina.** Arch. of Ophth., 1936, v. 16, Aug., pp. 173-187.

In five cases the author combined surface coagulation and multiple perforating microcoagulation. Two cases were of traumatic giant holes caused by contusion, and three were of spontaneous detachment associated with high myopia, and caused by enormous holes which imitated disinsertion although clinically different. The author's results indicate that these cases are not so hopeless as previously considered. The article is illustrated by fundus drawings and perimetric charts.

J. Hewitt Judd.

Zur Nedden, M. **Heredity of idiopathic retinal detachment.** Klin. M. f. Augenh., 1936, v. 97, Aug., p. 236.

Two genealogic trees of inherited retinal detachment are reported and discussed. In the second the father suffered from myopia and detachment of the retina, and the hyperopic son acquired detachment whereas the children with myopia had remained unaffected so far. The prevailing conception that myopia is the chief cause of idiopathic detachment of the retina must be abandoned, as the author maintained five years ago. He has observed that very highly myopic eyes tolerate the most severe contusions without detachment resulting. Apart from direct intense contusions of the eyeball, bodily exertion or contusions of the head and body are not proved causes of detachment.

C. Zimmermann.

11

OPTIC NERVE AND TOXIC AMBLYOPIAS

Abeles, M. M. **Medullated optic nerve fibers accompanying oxycephaly and other cranial deformities.** Arch. of Ophth., 1936, v. 16, Aug., pp. 188-196.

The author observed medullated nerve fibers in nine out of fifteen cases of oxycephaly. Six cases were observed in which medullated fibers were not associated with any obvious abnormality of the skull. Medullation was present in four cases of macrocephaly, two of brachycephaly, two of dolichocephaly, and one of trigonocephaly. The author reviews the literature and discusses the development and myelinization of the optic nerve and presents possible explanations for the frequent association of medullated fibers and skull deformities.

J. Hewitt Judd.

Arruga, H. **Treatment of optic atrophy.** Klin. M. f. Augenh., 1936, v. 97, Sept., p. 308.

Since May, 1935, Arruga has treated his cases of tabetic optic atrophy according to Lauber's method of increasing general blood pressure and decreasing ocular tension. He reports six clinical histories, confirming Lauber's favorable statements. The general blood pressure may be increased by general nutrition, higher altitude, and drugs (caffein, strychnine). Diminution of intraocular hypertension may be effected by pilocarpin and decompressive operations. Patients with tabetic atrophy showed low general blood pressure. The loss of vision is probably caused partly by compression of the retinal capillary network from insufficient blood pressure in the intraocular arteries. If the general blood pressure is increased and the intraocular pressure decreased, the course of the disease is favorably influenced. Likewise, glaucomatous patients show an improvement if general blood pressure rises, and an impairment if it sinks.

C. Zimmermann.

Bistis, J. **Some cases of quinine amblyopia.** Zeit. f. Augenh., 1936, v. 90, Sept., p. 13.

Bistis has seen six cases of quinine amblyopia among 22,000 eye patients as against Uhthoff's one in 100,000. Three of these are described in this essay. In each, eight grams of quinine had been taken. In the first patient, a youth of seventeen years, full recovery of vision occurred. The second, a weak old man who had had malaria, retained field contraction and a large ring scotoma. The third, an alcoholic, was totally blind, and after twenty days could barely count fingers; but after treatment with acetylcholin and retrobulbar atropin injections, his visual acuity rose to 8/10, though the visual field remained reduced to 25° and 40° in the right and left eyes respectively. Prognosis is therefore favorable as to visual acuity, particularly in strong and healthy individuals; although field, pupillary reactions, and accommodation may be permanently damaged. Injections of acetylcholine combined with retrobulbar injections of atropin seemed to be the most promising therapy.

F. Herbert Haessler.

Boen-Lian, Sie. **Eye changes in tabes dorsalis in Java.** Folia Ophth. Orientalia, 1936, v. 2, April, p. 126.

The author studied 58 cases of tabes dorsalis in Java and found that a greater percentage had optic nerve atrophy than in European statistics. Optic nerve atrophy was found frequently in the ataxic stage. Anisocoria, irregularity of the pupils, and absence of light reflex were frequent. Miosis was but seldom seen in native tabetic patients with disturbance of vision. The abortive form of tabes, eye tabes, in which optic atrophy was the only sign of tabes, was very frequently seen.

R. Grunfeld.

Campbell, E. H. **Relationship of sinusitis to optic and retrobulbar neuritis, with special reference to etiology and treatment.** Arch. of Ophth., 1936, v. 16, Aug., pp. 236-247.

Theories regarding the relationship of sinusitis to optic neuritis are reviewed. The author gives causative factors in order of importance as: (1) multiple sclerosis, (2) toxemia, systemic or chemical, (3) tumors or cysts at the base of the frontal lobe, (4) acute infectious diseases, (5) focal infections, (6) syphilis, (7) metabolic disturbances, (8) lactation, (9) Leber's disease. In those cases in which sinusitis is indicated by elimination of other factors, the treatment should be conservative rather than radical. A practical method of procedure is outlined. (Discussion.)

J. Hewitt Judd.

Duc, Camillo. **Visual symptoms of mescal intoxication.** Boll. d'Ocul., 1936, v. 15, July, pp. 745-760.

The writer tried on himself and fourteen other individuals the effect of mescal taken orally. The rare colored visual impressions lacked the intensity described by other authors, while the toxic symptoms were quite disturbing. Emmetropic subjects did not note any change of refraction, nor did the author

note a decrease or disappearance of myopia. (Bibliography.)

M. Lombardo.

Fejér, J. **The value of atropin treatment with special application to tabetic optic atrophy.** Arch. f. Augenh., 1936, v. 110, Sept., p. 76.

The author investigated the effect of retrobulbar atropin injection in optic atrophy of various but chiefly tabetic origin. Although the visual acuity in tabetic optic atrophy improved shortly after the treatment, the improvement was neither considerable nor of long duration. The main value of atropin treatment lies, however, in the fact that the course of the disease is made distinctly slower, and the existing visual acuity may be preserved for a long time. While the author advocates the treatment, he warns against relying on it too much, since it often proves ineffective. In retrobulbar optic atrophy, however, atropin injection is followed by distinct and lasting improvement, which may be due to improved nourishment brought about by the injection.

R. Grunfeld.

Glees, M. **Clinical contribution concerning the question of calcium shadows in the vicinity of the chiasm in optic nerve atrophies.** Arch. f. Augenh., 1936, v. 110, Sept., p. 121.

Every patient over fifty years of age was examined by X ray for calcium shadows in the vicinity of the sella. Among the 40 cases examined 27 showed various changes. Calcification of the internal carotid was noted five times, once in so-called pseudoglaucoma of which four cases were examined, and in every fifth case of true glaucoma. It seems improbable that these calcium shadows are in any direct causal relationship with the optic nerve change, rather they seem to be expressions of a general arteriosclerosis on the basis of which the optic-nerve disease develops. R. Grunfeld.

Igersheimer, Josef. **Contribution to the pathology and pathogenesis of papilledema.** Folia Ophth. Orientalia, 1935, v. 2, Nov., p. 1.

In a case of frontal lobe tumor combined with papilledema a hemorrhage was found in each optic nerve which might be regarded as the cause of the central scotoma so often found in frontal lobe tumors. Serial microscopic examinations of six cases of papilledema revealed that the central vein of the optic nerve was always gaping. In one case, on the side where the papilledema was most prominent, no axial edema was found. On the other side, where the papilledema was less pronounced, axial edema of extraordinary extension was noted. These findings speak against Schieck's theory of papilledema formation. Recent cases of papilledema generally showed Marchi's degeneration running continuously from the papilla to the chiasm. In a very recent case of only one to two days duration an isolated focus of Marchi's degeneration was found in the chiasm and extending into one optic nerve.

R. Grunfeld.

Jedlowski, Paolo. **As to the initial lesions of nerve fibers of the optic nerve.** Riv. Oto-Neuro-Oft., 1936, v. 13, May-June, pp. 275-280.

The changes described are in the optic-nerve fibers of a dog poisoned with quinine. The microscopic sections were treated by Donaggio's method. Among normal fibers were others presenting the characteristics of primary degeneration. Researches made by the same method after frontal trauma showed the same histochemical changes in numerous fibers. Sections of the optic nerve fibers in two cases of progressive paralysis showed like characteristics when treated by this method. Thus so-called functional lesions of the optic nerve may correspond to real changes in the nerve fibers which can be demonstrated objectively. M. Lombardo.

Lopez, Albo, Wenceslao. **A case of subacute opticomyelitis.** Rev. Cubana de Oto-Neuro-Oft., 1936, v. 5, March-April, p. 60.

Retrobulbar neuritis in one eye was followed by that of the other eye in two months, and only ten months later by myelitis from which the patient died.

The principal differential diagnosis between this type of opticomyelitis and multiple sclerosis is the lack of remissions and relapses. M. Davidson.

Mattos, W. B. **Congenital epipapillary membrane.** Rev. Oto-Neuro-Oft., 1936, v. 11, May, p. 126.

A unilateral case of a very large triangular veil covering all the disc and extending upward and downward and nasally is described and illustrated.
M. Davidson.

Soriano, F., Malbran, J., and Picoli, H. R. **Toxic amblyopias from pentavalent arsenicals.** Arch. de Oft. de Buenos Aires, 1936, v. 11, July, p. 393. (See Amer. Jour. Ophth., 1936, v. 19, Nov., p. 1038.

Worms, G. **Optic neuritis of sphenoidal origin.** Bull. Soc. Franç. d'Opht. 1935, v. 48, pp. 404-412.

A man of twenty-one years complained of headache and loss of vision. Examination showed evidence of Fröhlich's syndrome. At postmortem examination the causal lesion was found to be a sphenoidal sinusitis which had resulted in optic neuritis and inflammation of the pituitary. No signs of the sinusitis had been recognized prior to death. P. J. Leinfelder.

Zethelius, M. **Lumbar puncture in the treatment of acute retrobulbar neuritis.** Acta Ophth., 1936, v. 14, pts. 1-2, p. 264.

A tabulated report of 45 cases treated by lumbar puncture with satisfactory results. Ray K. Daily.

Ziering, Josef. **The papillary and parapapillary conus heterotypicus.** Klin. M. f. Augenh., 1936, v. 97, Aug., p. 169.

Ziering distinguishes conus papillaris from conus parapapillaris. The former originates from abnormal development of the embryonic papilla, probably due to a greater malformation, with a defect of the end of the optic nerve. The developmental disturbances at the ocular cup in conus parapapillaris cause retinochoroidal defects. In conus papillaris the disturbance occurs at the fetal optic fissure whereas in conus parapapillaris it is in the area of the optic cup. Nineteen cases are reported with 31 heterotypic coni corresponding to eight bilateral and four unilateral paracentral scotomas. These genetically and functionally different conuses cannot always be differentiated ophthalmoscopically, and may occur in a mixed form. The central vision of eyes with conus parapapillaris was better than that of those with conus papillaris, for corneal astigmatism which is frequently found in these cases may be responsible. (Illustrated.) C. Zimmermann.

12

VISUAL TRACTS AND CENTERS

Agnello, Francesco. **Semiologic and clinical value of internal ophthalmoplegia.** Riv. Oto-Neuro-Oft., 1936, v. 13, March-April, pp. 149-164.

A man of forty years was affected by a complete mydriasis of the left eye with loss of iris reflexes. The condition disappeared spontaneously, as it had done a few years before. The Wassermann was strongly positive. The writer regards the symptoms as due to neuritis of luetic origin affecting the reflex peripheral path between the ciliary ganglion and the iris. Another man, 26 years old, showed loss of pupil reactions bilaterally, pupils of moderate size, homonymous hemianopsia of the lower quadrants, beginning bilateral grey atrophy of the optic nerves and other general nervous symptoms. The Wassermann was positive. In this case the cause of the disease was probably a luetic meningeal focus at the lower lip of the calcarine fissure. In each case the internal ophthalmoplegia was the main symptom pointing to lues. (Bibliography, one figure.)
M. Lombardo.

Bartels, M. **Tumors of the hypophyseal region.** Klin. M. f. Augenh., 1936, v. 97, Aug., p. 185.

Seventeen clinical histories are given (some with autopsies) with the con-

clusion that nothing definite as to the course of the visual disturbances or objective findings in the optic nerve can be stated as characteristic for all cases. The discussion includes general disorders, as of menstruation, pernicious anemia, headache, general fatigue, and psychic affections. In no case could a certain prognosis or a decision for or against operation be given. (Illustrated.) C. Zimmermann.

Filippi-Gabardi, Eugenio. **Contribution to the study of cortical blindness.** Saggi di Oft., 1934-36, v. 8. (See Amer. Jour. Ophth., 1936, v. 19, July, p. 624.)

Filippi-Gabardi, Eugenio. **Further clinical contribution to knowledge of ocular syndromes from lesions of the internal carotid artery.** Saggi di Oft., 1934-36, v. 8. (See Amer. Jour. Ophth., 1935, v. 18, Nov., p. 1072.)

Gjessing, H. G. A. **Transitory word blindness associated with right homonymous hemianopia.** Arch. of Ophth., 1936, v. 16, July, pp. 5-7.

A man aged 65 years presented a right homonymous hemianopia with dyslexia, which disappeared within five weeks. Two months later the patient died from prostatic cancer. The lesion was thought to be either a carcinomatous metastasis or cerebral vascular disease localized in the posterior portion of the outer, upper surface of the angular gyrus of the temporal lobe and the contiguous portions of the occipital lobe. The improvement in the visual fields is attributed to the fact that the patient was partially left-handed. J. Hewitt Judd.

Klauber, E. **Loss of sight in acute disseminated encephalomyelitis.** Ceskoslovenska Oft., 1935, v. 2, no. 3, pp. 185-189.

The author reports three cases. In addition to spastic paraplegia of the lower extremities and pareses of the arms, these patients had marked disturbance of vision, depending on the location of the central lesion. Return to normal vision after termination of the disease was aided, the author feels, by intravenous use of sodium thiosulphate and glucose.

G. D. Theobald.

Puglisi-Duranti, Giovanni. **Ocular manifestations of posterior cervical sympathetic syndrome.** Saggi di Oft., 1934-36, v. 8. (See Amer. Jour. Ophth., 1935, v. 18, Dec., p. 1177.)

Reisser, S. **Disturbance of vision in a case of adiposogenital hypophyseal dystrophy.** Sovietskii Viestnik Opht., 1936, v. 9, pt. 1, p. 68.

A woman of twenty years came complaining of impairment of vision and was found to have a bitemporal hemianopsia. Neurologic examination revealed that she had Fröhlich's disease. She subsequently developed optic atrophy. Ray K. Daily.

Velter, E. **Diagnosis of affections of the chiasmal and sellar region.** Arch. d'Opht., 1936, v. 53, Aug. p. 593.

The essential elements of the chiasmatic syndrome are: (1) hemianopsia—almost always bitemporal, rarely binasal (in some cases of meningioma arising from the lesser wings of the sphenoid), occasionally lateral or horizontal (extensive alterations of the inferior or superior surface of the chiasm); (2) modification of visual acuity in relation to alterations of the optic nerve; (3) pupillary disturbances (hemiopic reaction of Wernicke); (4) oculomotor and sensory-motor disturbances indicating extension of the lesion; (5) infundibulo-tuberal disorders (reveal the progressive development of lesions toward the floor of the third ventricle; (6) general syndromes of hypophyseal origin and radiologic study of the sella turcica. There are two groups of affections of the chiasmatic region: (1) tumors—intrasellar, retrosellar, and suprasellar; (2) inflammatory and traumatic. The author cites illustrative cases. (Bibliography, illustrations.) Derrick Vail.

13

EYEBALL AND ORBIT

Argüello, D., and Grolman, G. von. **Ocular nevus.** Arch. de Oft. de Buenos Aires, 1936, v. 11, July, p. 417.

The case reported presented melanosis of sclera and iris and marked pigmentation of the fundus including the physiologic cup. The subject of melanosis of cornea, sclera, iris, fundus, and nerve head is incidentally reviewed.
M. Davidson.

Caramazza, Filippo. **Voluminous angiomata of the upper lid treated with surgical diathermy.** Saggi di Oft., 1934-36, v. 8. (See Amer. Jour. Ophth., 1935, v. 18, June, p. 600.)

Chapman, K. H. **Human cyclopia.** Arch. of Ophth., 1936, v. 16, July, pp. 40-45.

Two cases are described briefly and a third is reported in detail. It had a single orbit which contained two sets of muscles. The small eye was placed superiorly and posteriorly in the orbit. Anteriorly there were a narrow conjunctival sac and lids, and in the center above the lids was a proboscis. The histologic findings are given in detail. (Photographs.) J. Hewitt Judd.

Clay, G. E., and Baird, J. M. **Restoration of the orbit and repair of conjunctival defects.** Jour. Amer. Med. Assoc., 1936, v. 107, Oct. 3, p. 1122.

Two cases are reported and illustrated in which grafts from the prepuce and labia minora were used to repair the defects. The authors conclude that these tissues are ideal for conjunctival grafts, and that enough tissue is available for complete restoration of the socket. Such tissue has none of the objectionable features of ordinary skin grafts. (6 figures.) George H. Stine.

Dejean, Ch. **Syndrome of the floor of the orbit.** Bull. Soc. Franç. d'Opht., 1935, v. 48, pp. 473-485.

Two cases are reported in which tumors involved the floor of the orbit. The symptoms included three periods. In the first stage there was violent pain in the region of the superior maxilla. In the second, pain was excruciating and there was anesthesia of the first two divisions of the trigeminal nerve. Exophthalmos and diplopia developed. The final symptoms were due to extension into the cranial cavity. (Illustrated.) P. J. Leinfelder.

Flachs, Hilda. **On participation of the orbit in sinusitises with special consideration of the maxillary sinus.** Folia Ophth. Orientalia, 1936, v. 2, April, p. 152.

The pathogenesis, diagnosis, and therapy of diseases of the orbit and of the optic nerve originating from sinusitis are discussed on the basis of seven clinical cases. Microscopic findings demonstrated that the inflammation was chiefly transmitted through the bone. In Palestine neuritis and diseases of the orbit rarely originate from inflammation of the antrum, but more frequently from inflammation of the ethmoid cells. Surgical intervention often became necessary.
R. Grunfeld.

Giuffrida, E., and Tristaino, L. **A case of ethmoidal mucocele, with special regard to surgical treatment.** Riv. Oto-Neuro-Oft., 1936, v. 13, May-June, pp. 244-265.

The authors emphasize the advantages of operating by the intranasal route in cases of ethmoidal mucocele, basing their opinion on permanent cure thus obtained in a woman of twenty years, after a first attempt by the external route had been followed by complete relapse. (Bibliography, 6 figures.)
M. Lombardo.

Grönvall, Herman. **Contributions to knowledge of the citric-acid content of the eye fluids under varying conditions and of the dehydrogenases in the retina.** Acta Ophth., 1936, v. 14, pts. 1-2, p. 109.

Tabulated report of 300 tests of the aqueous, vitreous, and blood serum of various mammals and birds for citric acid by the Thunberg method shows that citric acid is found in these fluids in a concentration characteristic for each species. The quantity of citric acid in the vitreous humor is very constant, while that in the blood serum is more variable. Each animal species shows a constant relation between the content of citric acid in the aqueous and vitre-

ous, while the ratio between the quantity of citric acid in these fluids and that in the serum is more variable. The factors influencing the citric-acid content of these fluids are the species of the animal, age, citrate concentration in the blood, and ocular pathology. Glaucoma and iridocyclitis raise the citric-acid content of the aqueous. The author also demonstrated the presence of dehydrogenases in the retina specific for citric, formic, acetic, succinic, and a number of other acids. Ray K. Daily.

Levinsohn, S. **Schüller-Christian's disease.** Jour. Med. Soc. New Jersey, 1936, v. 33, March, p. 163.

The author reports a case of Schüller-Christian's disease in a 5-year-old girl. It improved under 0.5 c.c. of pitressin twice daily.

Theodore M. Shapira.

Lotin, A. B. **Orbital encephalocele.** Sovietskii Viestnik Opht., 1936, v. 9, pt. 1, p. 39.

A review of the literature and a report of a case in an infant four months old. The encephalocele was situated at the inner angle of the orbit, and was entirely separated from the brain. The diagnosis was made upon microscopic examination. (Illustrations.)

Ray K. Daily.

Moretti, Egisto. **Inclusion of glass sphere in the scleral shell.** Reprint from Bollettino della Soc. medico-chirurgica di Catania, 1936, v. 4, no. 8, pp. 458-469.

Of 25 Mules operations, six were followed by expulsion of the sphere. But there were no other complications, and the author prefers this method to enucleation or evisceration. (Bibliography.) W. H. Crisp.

Moutinho. **Three cases of anophthalmos.** Bull. Soc. Franç. d'Opht., 1935, v. 48, pp. 423-428.

The author reports three cases of anophthalmos, with cystic colobomata of the lids. From the clinical standpoint a differential diagnosis could not be made, but roentgenologic study of the sella turcica of one case indicated microphthalmos. (Illustrated.)

P. J. Leinfelder.

Petri, Mario de. **Intermittent and pulsating exophthalmos and their therapy.** Saggi di Oft., 1934-36, v. 8. (See Amer. Jour. Ophth., 1936, v. 19, Jan., p. 78.)

Puglisi-Duranti, Giovanni. **Unilateral microphthalmos and ribbon opacity of the cornea.** Saggi di Oft., 1934-36, v. 8. (See Amer. Jour Ophth., 1936, v. 19, Dec., p. 1144.)

Satanowsky, Paulina. **Basedow's disease with unilateral ocular symptoms and without goiter.** La Semana Med., 1936, v. 43, Sept. 10, pp. 689-713.

Four cases are described and illustrated, and the literature is reviewed. The author comes to the following conclusions: The ocular symptoms of Basedow's disease are only exceptionally due to stimulation of the cervical sympathetic by goiter. Ocular symptoms resembling those of Basedow's disease have been observed in affections of the nervous system localized at the level of the third ventricle and near the aqueduct of Sylvius. The ocular symptoms of Basedow's disease correspond to lesions of the mesencephalic center of the sympathetic, produced either by the toxic product of hyperthyroidism or by various agents which act primarily upon that center. Clinical, pathologic, and experimental studies suggest two origins for Basedow's disease, first, diencephalic resulting from infectious toxic and psychic agents; second, primary endocrine changes. (Bibliography.) W. H. Crisp.

14

EYELIDS AND LACRIMAL APPARATUS

Alkio, V. V. **The insertion of a wire into the lacrimal canal for introduction of a spiral canula into the nasolacrimal duct.** Klin. M. f. Augenh., 1936, v. 97, Sept., p. 381.

Referring to his previous article (see Amer Jour. Ophth., 1936, v. 19, p. 629),

Alkio modified his application of a silk thread by substitution of a wire and describes his method in detail with illustrations. C. Zimmermann.

Bab, Werner. **Allergic eye diseases after permanent dyeing of the lashes.** Klin. M. f. Augenh., 1936, v. 97, Sept., p. 391.

Five cases after dyeing the eyelashes with henna developed severe irritation, conjunctivitis, edema of the lids, and hordeola as allergic reactions. Henna comprises not only the innocent vegetative product but also all dye stuffs called collectively henna. These contain deleterious ingredients, chiefly tar dyes. The best treatment consisted in cool or lukewarm eye-baths of physiologic salt solution. The affection showed a tendency to relapse on slight cause.
C. Zimmermann.

Barrada, M. A., and Mohamed, I. A. **Gangrene of the lids.** Bull. Ophth. Soc. Egypt, 1935, v. 28, pp. 46-54.

This case has already been reported by Mohamed (Amer. Jour. Ophth., 1936, v. 19, p. 444). List of references.

Brecher, I. **Intermarginal graft of egg membrane . . . for surgical treatment of trichiasis.** Folia Ophth. Orientalia, 1936, v. 2, April, p. 149.

The author modifies Van Milligan and Goldfeder's method by introducing a piece of egg-pellicle, single or folded double, into the intermarginal incision as a substitute for the mucous membrane or cartilage used by the above named surgeons. This procedure is suitable for all cases of partial trichiasis. Its advantages are that this alloplastic material is easily procured and is tolerated by the tissues without any reaction; and further that the operation is simple and dispenses with the inconveniences of a second wound.
R. Grunfeld.

Bushmich, D. G. **Gumma of the lids.** Sovietskii Viestnik Opht., 1936, v. 9, pt. 1, p. 65.

A report of this rare occurrence in a farmer 41 years of age. The ulcerated gumma involved the conjunctival and cutaneous surfaces of the inner half of the right lower lid. It healed under specific treatment. Ray K. Daily.

Esser, J. F. S. **Epithelial inlay in cases of refractory ectropion.** Arch. of Ophth., 1936, v. 16, July, pp. 55-57.

A girl aged seventeen years had large scars of face and neck resulting from a burn. The lower lip and left lower lid were absent and there was ectropion of the right lower lid. Skin grafts placed on models of Stent's mass were used according to the author's method and gave a good functional result. (Photographs.) J. Hewitt Judd.

Esteban, M. **A cause of failure in dacryocystorhinostomy.** Rev. Cubana de Oto-Neuro-Oft., 1936, v. 5, May-June, p. 99.

In order to eliminate a remaining diverticulum at the bottom of an excessively long sac, in doing the Dupuy-Dutemps, the author includes the bottom of the sac in the suture of the nasal mucosa. (Illustrated.) M. Davidson.

Fasselova, M. **A contribution to the etiology of ethmoiditis.** (Eye cases.) Ceskoslovenska Oft., 1935, v. 2, no. 3, pp. 198-201.

Two cases of ethmoiditis are reported in which the clinical manifestations were disproportionate to the gravity of the cause. In the first case, abscess and fistula occurred in the inner angle about a month after injury by a 5.5-cm. splinter of wood which penetrated through the lacrimal sac into the ethmoids. In the second case an ethmoid abscess occurred two weeks after a slight cold. Both the general condition and that of the eyes were grave. An intense pain under the internal canthal ligament led to the diagnosis. G. D. Theobald.

Feigenbaum, Aryeh. **Simple procedure of advancement of the levator combined with tarsectomy in trachomatous as well as in congenital ptosis.** Folia Ophth. Orientalia, 1935, v. 2, Nov., p. 50.

The author dissects a tarsoconjunctival flap and attaches the adjoining

levator tendon with two to four doubly armed sutures to the margin of the lid after having excised the flap. This operation gave excellent results in trachomatous ptosis. It is suitable for congenital ptosis as long as some residual function of the levator is present. R. Grunfeld.

Herken, Hans. **Contribution to the pathologic histology of the tear gland.** Arch. f. Augenh., 1936, v. 110, Sept., p. 61.

The author examined the tear glands of 108 autopsied cadavers. He discovered that the tear gland was always attacked in infectious diseases of other organs, for example in diphtheria and pneumonia. A small amount of fat in the tear-gland epithelium is considered normal. In senile glands we find pigment as well as fat. Tuberculosis, general infection, carcinoma, and chronic diseases show a considerable amount of fatty degeneration of the epithelium. In sixty cases, of which forty were over fifty years old, lipomatosis was found in connection with atrophy of the gland. Tear-gland atrophy may or may not be accompanied by increase in connective tissue. After fifty years of age all tear glands have increased connective tissue. In atrophic glands due to carcinoma or infectious diseases the follicles are missing. In one case of Mikulicz' disease symmetrical enlargement of the gland was noted.

R. Grunfeld.

Jablonska, Zofja. **Autovaccine treatment of purulent affections of the ciliary border.** Klin. M. f. Augenh., 1936, v. 97, Sept., p. 362.

Whereas the treatment with staphylococcus serum of purulent diseases of the lid margins, which in man are mostly due to infection by staphylococcus aureus and albus, was unsuccessful, the vaccine therapy yielded positive results. In many cases in which the condition had lasted a long time and resisted other therapy, the authoress had much success with autovaccines. The preparation of the autovaccine is described in detail. Then the authoress reports her experience with brilliant green in 28 tabulated cases. She concludes that the first place in the treatment of obstinate inflammations of the lid margin should be given to autovaccines, and that brilliant green is always a valuable auxiliary.

C. Zimmermann.

Murphy, F. **Technique in using trichloracetic acid for removal of moles upon the eyelids and other parts of the body.** Jour. Iowa State Med. Soc., 1936, v. 26, March, p. 147.

The author describes the removal of moles by application of trichloracetic acid with a white pine stick. Only the skin is cauterized, the deeper layers being unaffected.

Theodore M. Shapira.

Peyret, J. A. **Our experience with stricturotomy combined with iodized oil injections.** Arch. de Oft. de Buenos Aires, 1936, v. 11, July, p. 429.

Successful results are reported in 36 new cases with the modification of not injecting the oil until four to six days after stricturotomy. M. Davidson.

Roy J. N. **Hypertrophy of the palpebral tarsi, the skin of the face, and the extremities, associated with a nearly generalized osteoperiostosis.** Ann. d'Ocul., 1936, v. 173, Aug., pp. 637-658.

A man of 47 years had been under observation for the past ten years for massive thickening of both upper and lower lids, sufficiently marked to produce ptosis and restriction of field. The skin of the face and extremities was pachydermatous. The fingers and toes were short and thick. The head was very large. Biopsies of the lids showed degeneration of the Meibomian glands with production of foreign-body granulomata and keloid hyperplasia of the tarsi. X rays of the bones demonstrated an almost generalized osteoperiostosis with thickening of the bones. Some of these changes had been noted at the age of three years. The author considers this a new syndrome probably resulting from endocrine disturbance.

John C. Long.

Tobgy, A. F. **Plastic operation for restoration of upper lid.** Bull. Ophth. Soc. Egypt, 1935, v. 28, pp. 21-25. (See Amer. Jour. Ophth., 1936, v. 19, May, p. 445.)

Vlacek, Theodor. **A sty with fatal outcome.** Ceskoslovenska Oft., 1935, v. 2, no. 3, pp. 203-206.

In a five-year-old child a sty resulted in phlegmon and acute staphylococcic septicemia, with death. The result was favored by general weakness from a previous angina. G. D. Theobald.

Weiss, A. S. **New procedure for trichiasis.** Folia Ophth. Orientalia, 1936, v. 2, April, p. 143.

An intermarginal incision along the excretory ducts of the Meibomian glands is made from the outer angle of the lid to the lacrimal punctum. Then, 4 to 5 mm. below and parallel with the lid margin, a longitudinal incision is carried through the anterior tarsal plate. At each end of this incision a vertical cut goes toward the lid border. The tarsus is dissected from the muscular layer and is turned ninety degrees to take a horizontal position, thus helping to form a new intermarginal border. It is fixed in this position with sutures. The eighteen cases so operated upon obtained good functional and cosmetic results.

R. Grunfeld.

15

TUMORS

Ask, O. **A case of metastatic uveal carcinoma.** Acta Ophth., 1936, v. 14, pts. 1-2, p. 279.

A report of a case of bilateral metastatic choroidal carcinoma, with the primary tumor in the pancreas.

Ray K. Daily.

Ebbehöj, Erik. **Treatment of cancer of the lids by radiation.** Hospitalstidende, 1936, v. 79, July 14, pp. 717-726.

The principle followed in the treatment of cancer of the lids is that the cancer cells must receive sufficient exposure, the rest of the lids as little as possible, and the eye itself none at all. The author has found the nearest approach to this ideal in the use of roentgen rays with a potential under 30 kv. A dose of 20,000 r with 12 kv. or a dose of 5,600 r with 25 kv. is sufficient. The eye is protected with a shell of lead glass, placed over the eye under the lids, and thick enough to exclude all rays from the eye.

D. L. Tilderquist.

Filippi-Gabardi, Eugenio. **Benign melanosis oculi.** Saggi di Oft., 1934-36, v. 8. (See Amer. Jour. Ophth., 1936, v. 19, May, p. 445.)

Filippi-Gabardi, E. **Xeroderma pigmentosum with ocular lesions.** Saggi di Oft., 1934-36, v. 8. (See Amer. Jour. Ophth., 1936, v. 19, Feb., p. 188.)

Johannson, Ernst. **A case of advanced melanosarcoma.** Zeit. f. Augenh., 1936, v. 90, Sept., p. 31.

In February, 1927, Johannson advised a man who was then 46 years old to have his right eye enucleated because of a diagnosis of melanosarcoma of the choroid. In 1936 a photograph of the man showed a cylindrical protuberance which issued between the stretched and deformed lids and extended to the level of the tip of the nose. The man was said to have retained vision in the eye for a few months after the consultation in 1927. The eye then began to protrude and became black, but no change seemed to have taken place in size or appearance of the mass for the last five years. The patient's health was in general good. F. Herbert Haessler.

Lundberg, A. **Oligodendrocytoma of the optic nerve.** Acta Ophth., 1936, v. 14, pts. 1-2, p. 271.

A detailed description of the histologic characteristics of the tumor as gathered by the author from his own nine cases. Ray K. Daily.

Mehney, G. H. **Primary tumor of the optic nerve.** Arch. of Ophth., 1936, v. 16, July, pp. 95-102.

Three cases are reported, one in a girl, aged ten, and two in boys, aged six and fifteen years. Surgical removal of the tumor was successful in two

cases, but in the third the tumor extended to the pons and complete removal was impossible. Histologic examination showed the tumors to be of the unipolar spongioblastoma type. (Illustrations.) J. Hewitt Judd.

O'Brien, C. S., and Braley, A. E. **Common tumors of the eyelids.** Jour. Amer. Med. Assoc., 1936, v. 107, Sept. 19, p. 933.

In a series of one hundred consecutive tumors of the lids which were studied clinically and microscopically, 84 were of various benign types and 16 were malignant. The benign tumors were classified as follows: papilloma 34, nevus 17, sebaceous cyst 13, fibroma 5, sudoriferous cyst 4, hemangioma 4, dermoid cyst 2, molluscum contagiosum 2, sweat-gland adenoma 1, xanthelasma 1, granuloma 1. Of the malignant tumors, 15 were carcinoma, and 1 was malignant melanoma. Accurate clinical diagnosis is sometimes difficult. (Discussion, 9 figures.)

G. H. Stine.

Sjögren, H. **Myoblastic sarcoma in the orbit.** Acta Ophth., 1936, v. 14, pts. 1-2, p. 277. (See Amer. Jour. Ophth., 1936, v. 19, May, p. 446.)

Vandevere, W. E., and Spearman, M. P. S. **Melanocarcinoma of the conjunctiva.** Arch. of Ophth., 1936, v. 16, July, pp. 46-50.

In a woman aged fifty years, a small dark-brown mass projecting from under the left upper lid was found to be a melanocarcinoma of the palpebral and bulbar conjunctiva, with possible extension down the nasolacrimal duct. The case presented an unusual problem in that the opposite eye was blind and the growth was too advanced for radiation therapy, hence treatment was solely palliative. (Photographs.)

J. Hewitt Judd.

16

INJURIES

Archangelskaja, N. D. **Siderosis of the eyeball.** Sovietskii Viestnik Opht., 1936, v. 9, pt. 1, p. 53.

A report of a case which had partial atrophy of the iris in the region of the primary injury as well as siderosis and cataract. The extracted lens and the segment of iris excised during the extraction showed chemically and microscopically the presence of iron.

Ray K. Daily.

Badot. **Statistics of ocular accidents in the coal industry.** Bull. Soc. Franç. d'Opht., 1935, v. 48, pp. 414-415.

Thirty percent of the injuries were due to blunt trauma, the remainder were perforating. The left eye was the more frequently injured.

P. J. Leinfelder.

Barrat, P., and Seigner, A. **A little-known occupational disease: intoxication by gas from certain submarine soils.** Ann. d'Ocul., 1936, v. 173, July, pp. 513-528.

Intoxication by gas has been encountered among submarine caisson and diving-bell workers at Toulon. Symptoms consist of ocular pain, blurred vision, sensation of halos around lights, and profuse lacrimation; with inflammation of the upper respiratory tract, headache, nausea, and vomiting. Usually the only objective ocular finding is hyperemia of the conjunctival and scleral vessels. Complete recovery takes place in a few days.

The intoxication occurs only when excavation is being done in a layer of soil composed essentially of the decomposing bodies of molluscs and other marine animals. The gaseous products of this decomposition are thought to be the noxious agents. Chemical analysis and experimental work on various compounds in the gas failed to incriminate any one constituent. (23 case reports.) John C. Long.

Basile, G. B. **Contribution to knowledge of the genesis of retrolenticular pigment ring.** Boll. d'Ocul., 1936, v. 15, July, pp. 761-776.

A luetic man of 63 years, in addition to a typical Krukenberg spindle on the cornea, showed a partial black ring on the posterior surface of each lens. This

appeared to be formed of brown pigment granules of different size, situated 2 mm. from the margin of the structure as seen under the slitlamp. The history is also given of a man of 56 years who after successful operation for retinal detachment showed a partial pigment ring having the same character as those previously mentioned. The writer remarks that the first case is related to pigmentary disintegration of the iris in tabes and the second to a surgical procedure. (Bibliography, and 4 figures.)

M. Lombardo.

Brav, Aaron. **Toxic ocular manifestations resulting from the use of eyelash dye.** Amer. Jour. Ophth., 1936, v. 19, Oct., pp. 894-895.

Brufman, R. I. **A case of successful removal of an eyelash from the posterior chamber.** Sovietskii Viestnik Opht., 1936, v. 9, pt. 1, p. 70.

In a case of perforating corneal injury with a wire, after the blood and exudate were absorbed an eyelash was seen projecting into the anterior chamber, most of it being hidden between the lens and the posterior surface of the iris. It was extracted and the eye made an uneventful recovery.

Ray K. Daily.

Clark, C. P. **Accidental freezing of the eye by sulphur dioxide.** Amer. Jour. Ophth., 1936, v. 19, Oct., pp. 881-884.

Derer, Josef. **Unusual injuries of the orbit.** Ceskoslovenska Oft., 1935, v. 2, no. 3, pp. 179-185.

Case 1. A twenty-nine-year-old farmer, while walking, stepped on a rock from which he slipped, landing heavily with his heels on another rock. He felt a concussion in his head and a short time later a pain in his left eye. The second day his eye was found subluxated from the socket; it was blind, and the lids were squeezed spasmodically back of it. Upon enucleation this proved to be a true subluxation. There had been no injury to the muscles or optic nerve, and no hemorrhage. The author feels that predisposing factors to the subluxation may have been faulty eye muscles, a long optic nerve, weakly developed tarso-orbital fascia, a large palpebral fissure, or a small eyeball.

Case 2. A twenty-year-old youth jumped from a horse and landed on his heels; he felt a concussion in his head and became dizzy. The third day he had incomplete paralysis of the left oculomotor nerve, evidenced by ptosis of the left upper lid. A subperiosteal hemorrhage compressed the oculomotor nerve at its entrance into the orbital fissure.

Case 3. A 25-year-old laborer had a basal fracture which included the optic foramen, from a blow with a bottle. This resulted in optic atrophy of the right eye.

G. D. Theobald.

Edwards, E. V. **Report of an unusual ocular injury.** Amer. Jour. Ophth., 1936, v. 19, Oct., pp. 895-896.

Kiss, Walter. **Early damage to the iris and lens in ammonia burn of the eye.** Arch. f. Augenh., 1936, v. 110, Sept., p. 98.

The left eye of a young person was accidentally burned with ammonia. The patient came under observation the day following the accident. The corneal parenchyma was severely damaged, but it never suppurated. Already at this early stage the iris was seen to be severely affected. The pigment layer was detached, forming several vesicles which hung as a cluster of grapes over the pupillary margin. The anterior subcapsular cortical layer of the lens was seen to be involved in the secondary changes. Later, hypopyon uveitis set in, the iris and the pigment layer became atrophied, cataract formed, and the eye came to enucleation. The author argues that the early damage to the iris and lens was due to the direct caustic action of the ammonia which diffused through the cornea into the anterior chamber; and was not a late consequence of nutritional changes caused by altered diffusional property of the tissues following the burn. Histologic examination of the eye seemingly supported the author's contention.

R. Grunfeld.

Polonskaja, L. D. **Ocular disease caused by pitch.** Sovietskii Viestnik Opht., 1936, v. 9, pt. 1, p. 62.

Four cases are reported. The symptoms and course of the disease are similar to electric ophthalmia. Pitch has photodynamic properties, and should be handled only at night. If handled in daylight extreme precautions should be taken to protect the eyes and to avoid contact of the pitch with exposed body areas. Ray K. Daily.

Stastnik, Emanuel. **Injury of the eye with amyl nitrite.** Ceskoslovenska Oft., 1935, v. 2, no. 3, pp. 201-203.

Explosion of an ampoule of amyl nitrite caused a burn in each eye. The left eye was also injured by a bit of glass which penetrated Bowman's membrane. Decomposing into amyl alcohol and nitric acid, the amyl nitrite caused only conjunctival hyperemia in the right eye, but in the left eye gave rise to an epithelial lesion involving half the cornea. Weak acid solutions were used in treatment. The author explains the grave effect in the left eye as due to the mechanical trauma by glass having enabled the amyl nitrite to penetrate the tissues. He confirmed his explanation by experiments on rabbit eyes. G. D. Theobald.

Tillema, A. **Partial rupture of the lamina cribrosa from contusion of the eyeball.** Arch. of Ophth., 1936, v. 16, July, pp. 36-39.

The microscopic findings in two globes are described and shown by photomicrographs. Each had been removed for painful traumatic glaucoma following severe contusion of the eyeball, and in each there was an atypical incomplete scleral rupture.

J. Hewitt Judd.

Vythianatha Iyer, T. R. **Birth injury of the cornea.** Proc. All-India Ophth. Soc., 1935, v. 4, pp. 120-121.

Only one birth injury of the cornea has been observed in the past fifteen years at the Government Ophthalmic Hospital, Madras. Detailed biomicroscopic examination is related of a corneal opacity, 4 mm. wide, extending from limbus to limbus and from the 1 o'clock to the 5 o'clock position, in the left eye of a twenty-year-old male Hindu. Descemet's membrane had been split and the edges rolled following a forceps delivery, one of the blades having gripped forcibly across the eye so as to indent the globe strongly.

Lawrence G. Dunlap.

17

SYSTEMIC DISEASES AND PARASITES

Biozzi, Giuseppe. **Ocular changes from asphyxia. The experimental cataract of asphyxia.** Saggi di Oft., 1934-36, v. 8. (See Amer. Jour. Ophth., 1935, v. 18, July, p. 692.)

Biozzi, Giuseppe. **Ocular manifestations of the sphenopalatine ganglion syndrome.** Saggi di Oft., 1934-36, v. 8. (See Amer. Jour. Ophth., 1936, v. 19, Sept., p. 833.)

Caramazza, F. **The biologic test in ocular diseases of suspected tuberculous nature.** Saggi di Oft., 1934-36, v. 8. (See Amer. Jour. Ophth., 1935, v. 18, May, p. 496.)

Charlin, C. C., and Gomez, Luis, 5. **Dental focal infection in ophthalmology.** Arch. de Oft. de Buenos Aires, 1936, v. 11, May, p. 251.

On the principle that an ophthalmopathy is attributable to a dental focus only if it is not otherwise amenable to treatment and responds immediately to elimination of the dental focus, the authors analyze fifty cases, some observed by themselves and others recorded in the literature. The disturbances involved cornea, conjunctiva, sclera, iris, ciliary body, optic nerve, retinal circulation, tension, motor apparatus, and orbit; and the nasal-nerve syndrome was encountered. The characteristics of the ocular manifestations include: unilaterality, remissions, relapses, bacteriologically negative abundant secretion in conjunctivitis, preference for anterior-segment involvement, concomitant sudden toothache, fre-

quency of hypopyon in iritis. Rapid restoration of vision even after optic atrophy had set in occurred in a case of retrobulbar neuritis. The dental focus is generally single, on the same side as the eye affected, in a multiple-root tooth in the upper jaw with a filled apical fourth-grade caries painless even to percussion. While the dental focus is regarded as microbic, although anaërobic if obturated, the eye focus is amicrobic trophic reflex involvement via the trigeminus. Openly carious and painful teeth should be immediately extracted even if X ray is negative.

M. Davidson.

De Sanctis, G. E. **Proetz's therapy in some forms of retrobulbar neuritis from latent sinusitis.** Riv. Oto-Neuro-Oft., 1936, v. 13, March-April, pp. 180-204.

A man of sixty years had been affected with right-sided headaches three and a half years before eye symptoms manifested themselves. Two women of 24 and 29 years had been affected respectively with occipital and uniform headache, the first woman two years and the other two months before eye symptoms appeared. In all three rhinoscopic and radiographic examination were negative for sinusitis and in only one case did injection of the posterior sinuses with lipiodol show some opacity on X-ray examination. Treatment with opaque substances according to Proetz's method, however, was followed by opacity of the sinuses on radiography, disappearance of the headaches, and improvement of ocular symptoms. The author regards occlusion of the orifice of the sinuses by mucous or inflammatory stenosis as the cause of the sinus vacuum, which the Proetz treatment may overcome with reestablishment of sinus aëration. (Bibliography, 3 figures.)

M. Lombardo.

Duggan, J. J., and Nanavati, B. P. **Eye diseases due to improper diet.** Proc. All-India Ophth. Soc., 1935, v. 4, pp. 1-26.

Night blindness, xerosis, and keratomalacia arise from absence of fat in certain Indian diets. Parboiled rice causes beri-beri, and infected corn causes pellagra. Xerosis of conjunctiva and cornea due to dietary deficiency in vitamin A is most common. For keratomalacia the treatment is locally normal saline solution, argyrol, (no atropin); and generally for the accompanying gastro-enteritis or pneumonia or both, plus cod-liver oil. Tuberculosis is mentioned as due to absence of fat in the diet. Pneumonia cases decreased after a rich vitamin A diet. Excess of carbohydrates caused phlyctenular disease, and treatment as for rickets was found best, plus indicated local therapy. Autointoxication rather than focal infection is stressed as the etiologic factor in rheumatism.

Lawrence G. Dunlap.

Filippi-Gabardi, Eugenio. **Reflex oculonasal connections.** Saggi di Oft., 1934-35, v. 8. (See Amer. Jour. Ophth., 1935, v. 18, Nov., p. 1080.)

Indra, H. K. **Xerophthalmia in children and adults with special reference to Bengal.** Proc. All-India Ophth. Soc., 1935, v. 4, pp. 53-67.

Xerophthalmia is rare among Europeans and other non-Indian races in Bengal. In Hindu and Mohammedan children the rates of xerophthalmia and keratomalacia are identical, but for adults the incidence is twice as great in Hindus. The children of poorer classes all lack sufficient milk, either mother's or cow's. The Mohammedan adult spends more for his diet and is accustomed to a richer diet than his Hindu fellow-citizen.

Lawrence G. Dunlap.

Narayana Rao, B. K., and Mehkri, M. S. **Affections of the eye in conditions of malnutrition.** Proc. All-India Ophth. Soc., 1935, v. 4, pp. 27-35.

The authors continue along the lines of a preceding paper, analyzing keratomalacia and thirty cases of conjunctival xerosis associated with night blindness. Congenital cataract is also discussed. Lawrence G. Dunlap.

Rosenzweig, M. G. **Filaria scrabini in the inner angle of the left upper lid.** Sovietskii Viestnik Opht., 1936, v. 9, pt. 1, p. 73.

The parasite was found accidentally when during excision of a cyst at the inner angle of the orbit the cyst was punctured and the parasite exposed.

Ray K. Daily.

Sen, K. **Nutritional disorders of the eye.** Proc. All-India Ophth. Soc., 1935, v. 4, pp. 36-52.

The author's paper, with many charts and tables and a bibliography of seventy references, attempts a complete review of avitaminosis. In one year (1934) out of 37,381 eye cases at the Calcutta Eye Infirmary, 412 were of xerophthalmia (168 adults and 244 children) and 151 keratomalacia (35 adults and 116 children).

Lawrence G. Dunlap.

Swett, W. F. **Eye complications following the use of reducing agents.** Amer. Jour. Ophth., 1936, v. 19, Sept., pp. 796-797.

Toulant and Medinger. **New cases of ocular myiasis from Oestrus ovis.** Bull. Soc. Franç. d'Opht., 1935, v. 48, pp. 400-403.

Two cases occurring in Algiers are reported. In one the eggs were introduced into the eye while in the other the larvae were introduced directly by a fly. P. J. Leinfelder.

Wilson, R. P., and Tobgy, A. F. **The ocular complications of the endemic diseases in Egypt.** Bull. Ophth. Soc. Egypt, 1935, v. 28, pp. 1-8. (See Amer. Jour. Ophth., 1936, v. 19, May, p. 451.)

18

HYGIENE, SOCIOLOGY, EDUCATION, AND HISTORY

Carle T. **Trachoma sections in southern Sweden.** Acta Ophth. 1936, v. 14, pts. 1-2, p. 245.

The author uses the material of the Lund clinic since 1872 to plot the prevalence of trachoma and indicate its endemic foci. Ray K. Daily.

Chance, Burton. **William Porterfield, M.D., an almost forgotten opticophysiologist.** Arch. of Ophth., 1936, v. 16, Aug., pp. 197-207.

Very little is known of the life of Porterfield except that he was a native of Scotland and at one time a professor in the University of Edinburgh. His remarkably thorough and keen powers of observation are indicated by the facts recorded as early as 1759 in his "A treatise on the eye, the manner and phenomena of vision." This anatomic and physiologic exposition described the structures and functions of the eye in man and various animals, and was illustrated by drawings and diagrams. Sample pages are reproduced in the article. J. Hewitt Judd.

Cowan, A., and Sinclair, S. M. **Causes of blindness in Pennsylvania.** Jour. Amer. Med. Assoc., 1936, v. 107, Sept. 5, p. 757.

The author discusses the medical and social aspects of the Pennsylvania blind relief law, and analyzes the stated causes of blindness in approximately 12,000 eyes. (Discussion, 2 tables.)

G. H. Stine.

Esser, A. A. M. **Ancient sources of Goethe's sentence: "If the eye were not sunlike, it could never see the sun."** Klin. M. f. Augenh., 1936, v. 97, Sept., p. 403.

Esser shows by quotations from Greek and Roman literature that Goethe's saying is a dignified expression of ancient thought.

C. Zimmermann.

Flaxman, Nathan. **Isaac Hays; pioneer American ophthalmologist.** Arch. of Ophth., 1936, v. 16, July, pp. 78-90.

This biography of the Philadelphia oculist outlines his clinical contributions and his literary achievements as founder and editor of the American Journal of the Medical Sciences. (Bibliography.) J. Hewitt Judd.

Franta, J. **The estimation of lessened earning capacity in changed working conditions.** Ceskoslovenska Oft., 1935, v. 2, no. 3, pp. 132-140.

In view of new industrial methods rules are recommended in considering diminished functional capacity.

G. D. Theobald.

Kolacny, Jaroslav. **Statistical tabulation of ocular traumatic injuries in Slovakia and Lower Russian Carpathia, 1920-1934.** Ceskoslovenska Oft., 1935, v. 2, no. 3, pp. 140-153.

The author analyzes official statistics respecting 1,112 workers whose insurable ocular injuries represent 5.13 percent of the total number of injuries. The author takes into consideration the sex of the worker; age at the time of the accident; the work at the time of injury; the object producing the trauma; the kind of trauma; the complications both direct and indirect; and the effects on ocular function. Other problems are discussed. G. D. Theobald.

Kraupa, E. **Albrecht von Graefe's lectures.** Zeit. f. Augenh., 1936, v. 90, Sept., p. 32.

Years ago Kraupa acquired a lithographic copy of notes of Graefe's lectures on the uvea and retina. Judging by numerous misspellings, the original was probably written by one untrained in the specialty. The content and form are in the main similar to Hirschberg's copy. As this set of notes is presumably a syllabus prepared by Graefe in the absence of a textbook at a time when the science was still in a state of construction, it seems unlikely that Hirschberg's wish that other lectures notes of Graefe's will come to light will be fulfilled. F. Herbert Haessler.

Kurz, Jaromir. **Remarks upon sections 17 and 13 of the retirement law for private employees.** Ceskoslovenska Oft., 1935, v. 2, no. 3, pp. 161-166.

For the practical use of physicians, this author reviews briefly two paragraphs of the pension law, and recommends uniform procedure in classification of patients. Detailed analysis is given of the provision for compensation in total blindness. It is important to recall that legally the blind are helpless. Total blindness is placed at 0.02.

G. D. Theobald.

Lebensohn, J. E. **The spectacle industry.** Arch. of Ophth., 1936, v. 16, Aug., pp. 284-292.

The author discusses the organization of the optical industries as a whole and gives many interesting facts regarding refracting and dispensing opticians, lenses and their inspection, and the trade in inferior lenses.

J. Hewitt Judd.

Luckiesh, M., and Moss, F. K. **Visual tasks in sight-saving classes.** Amer. Jour. Ophth., 1936, v. 19, Nov., pp. 992-999.

Majewski, K. W. **On the myopia of Jean Matejko, Polish painter.** Ann. d'Ocul. 1936, v. 173, July, pp. 554-559. (See Amer. Jour. Ophth., 1936, v. 19, Sept., p. 837.)

Mehlmack, Friedrich. **The clinic for eye tuberculosis.** Arch. f. Augenh., 1936, v. 110, Sept., p. 39.

The author reviews the clinical material of 335 patients admitted to the hospital for tuberculous eye involvement between the years 1921 and 1934. The diagnosis, clinical course, and treatment are described. Statistical data as to frequency of the different eye diseases are given. R. Grunfeld.

Mills, Lloyd. **Peripheral vision in art.** Arch. of Ophth., 1936, v. 16, Aug., pp. 208-219.

The author discusses the use of indirect vision by various artists in the development of impressionistic pictures and the change in art which has arisen out of uncorrected imperfect sight, especially myopia and high astigmatism. J. Hewitt Judd.

Olsho, S. L. **Dark room for scientific meetings.** Amer. Jour. Ophth., 1936, v. 19, Oct., p. 894.

Reimova-Frantova, M., and Franta, J. **Estimation of working efficiency in central retinal lesions.** Ceskoslovenska Oft., 1935, v. 2, no. 3, pp. 166-174.

This study deals with ten patients who had central retinal lesions. The im-

portance of red-free light as an aid in estimating the extent of the lesion is emphasized. Visual fields must be taken. One must determine the character of the lesion, its age, and the problem of recurrence. The amount of insurance such patients are entitled to depends on the kind of work they do.

G. D. Theobald.

Sitzimkopfova, Helena. **Relation between classification of employees and amount of injury sustained.** Ceskoslovenska Oft., 1935, v. 2, no. 3, pp. 154-160.

This study deals with the conditions and circumstances given in the official report of damages for eye injuries occurring from 1920 to 1934 in Slovakia and Lower Russian Carpathia. The author thinks the term "qualified worker" does not enter into consideration in ordinary cases involving damages for eye injuries, but should be reserved for special infrequent cases in which the occupation of the injured worker calls for remarkably acute vision.

G. D. Theobald.

Slavik, B. **Indemnity for eye accidents by private insurance organizations.** Ceskoslovenska Oft., 1935, v. 2, no. 3, pp. 129-132.

In determining the indemnity by private insurance institutions one must proceed analytically, just as is done in workmen's-accident-insurance organizations. With consideration for its original condition, the loss of one eye is to be compensated at the rate of 25 percent, providing the man's capacity for work is not diminished. It is recommended also that minor visual impairments which are not now recognized in workmen's insurance be indemnified. Consequently the indemnity for graver visual impairment of one or both eyes, according to an accompanying table, is somewhat higher than in workmen's accident insurance. G. D. Theobald.

Yanes, T. R. **Industrial eye injuries in the one-eyed worker.** Rev. Cubana de Oto-Neuro-Oft., 1936, v. 5, March-April, p. 39.

Yanes discusses the medicolegal problems involved in injury to the remaining eye of the one-eyed worker: that of temporary total disability resulting from need for exclusion of the injured eye; that of compensation for permanent partial or permanent total loss of vision of the remaining eye; and that of traumatic aphakia of the remaining eye. He considers it not only unfair to charge the insurance company with a loss greater than their assumed liability, but against public policy since because of increased risk it would prevent the one-eyed worker from securing employment. In the absence of a law in Cuba like that in the State of New York, where a special state fund exists to take care of the difference, it is suggested that the insurance carrier be liable for not more than seventy percent loss of earning capacity in case of permanent total disability, since there has already been a 30 percent loss from the preëxisting blindness of one eye. In the case of aphakia of the remaining eye with corrected visual acuity of 20/40 the compensation should be that of loss of an eye but not that of permanent total disability.

M. Davidson.

19

ANATOMY, EMBRYOLOGY, AND COMPARATIVE OPHTHALMOLOGY

Bruno, Giovanni. **The ciliary insertion and probable histologic significance of the fibers of the zonule of Zinn.** Ann. di Ottal., 1936, v. 64, June, p. 400.

The author reviews the observations of the workers up to the present. After studying celloidin preparations of the ciliary region and zonule of the rabbit and of man, he made sketches by the aid of the camera lucida which are reproduced in figures and plates. He shows that the fibers of the zonule take their origin in special cells grouped in the superficial strata of the preoral retina. (Plate, 2 figures, bibliography.)

Park Lewis.

Caramazza, Filippo. **The retina and optic nerve in some anencephalic monsters.** Saggi di Oft., 1934-36, v. 8. (See Amer. Jour. Ophth., 1935, v. 18, Jan., p. 100.)

Damel, C. S. **The embryology and anatomy of the retinal central vessels and their branches.** Arch. de Oft. de Buenos Aires, 1936, v. 11, June, p. 345.

Damel agrees with Mann that for proper understanding of the development of the intraocular vascular system in the vertebrates it is necessary to start with a stage of ocular evolution common to all species, namely that of invagination of the ocular vesicle with the lens occupying the anterior part of the cup and a fetal cleft below. In the trout, however, there exists already at this stage a falciform process, a mass of capillaries lining the inner surface of the retina from the papilla to the ora. The central artery of the retina in man is recognizable at three months in the form of a button on the posterior end of the hyaloid vessel. The latter begins to atrophy at five months. The physiologic cupping is therefore the result of the confluence of the optic nerve fibers in the epithelial papilla and the amount of glial tissue remaining. There remains always a thin membrane separating the excavation and the vitreous, and communication between them is never complete. (Illustrated.)

M. Davidson.

Ernyei, S. **The relation of the sympathetic system to the ciliary nerves.** Graefe's Arch., 1936, v. 136, p. 40.

In the entire course of the ciliary nerves, there occurred in cross-section light and round (afferent) as well as dark and polygonal (efferent) cells. The latter could be derived not only from the dark cells of the ciliary ganglion but also from those of the sympathetic ganglions of the carotid plexus. Occurring in the vicinity of the ciliary nerves in nerve bundles of nonmedullated fibers these cells represent direct continuation of the internal carotid plexus. They are the autonomic nerves of the vessels. In the immediate vicinity of the eyeball, a small sympathetic ganglion lay beside a ciliary nerve-bundle. The latter was probably a small displaced ganglion of the internal carotid plexus.

H. D. Lamb.

Glücksmann, A., and Tansley, K. **Some effects of gamma radiation on the developing rat retina.** Brit. Jour. Ophth., 1936, v. 20, Sept., pp. 497-509.

Because the rat retina is not completely developed at birth, rats from two to eleven days old were used by the authors for the radiation experiments, with the following results: The amount of degeneration of the undifferentiated cells of the retina depends upon the dose of the rays and the age of the rat. The size of the eye diminishes upon radiation. The formation of new fiber layer and rosettes is secondary and not a direct effect of radiation. (2 tables, 11 figures.)

D. F. Harbridge.

NEWS ITEMS

Edited by Dr. H. Rommel Hildreth
640 S. Kingshighway, St. Louis

News items should reach the Editor by the twelfth of the month

DEATHS

Dr. William Alfred Mann, Sr., Chicago, died October 8, 1936, aged 77 years.

Dr. Samuel P. Glover, Altoona, Pa., died October 3, 1936, aged 76 years.

Dr. Eugene D. Regan, Milwaukee, died October 15, 1936, aged 62 years.

Dr. Max Feldman, Brooklyn, died October 4, 1936, aged 65 years.

Dr. Gustavus Ingowar Hague, Milwaukee, died September 28, 1936, aged 64 years.

Dr. Charles Christian Walker, Detroit, died September 28, 1936, aged 61 years.

MISCELLANEOUS

On December 16, 1936 Dr. Allen Greenwood delivered the Henry Willard Williams Memorial Lecture at the Boston City Hospital. His subject was 'History of ophthalmology in New England."

The Eleventh Annual Spring Graduate Course in Ophthalmology and Otolaryngology of the Gill Memorial Eye, Ear, and Throat Hospital will be held April 12 to 17, 1937, in Roanoke, Virginia. The following physicians will lecture and operate for the ophthalmic course: Dr. Wendell L. Hughes and Dr. Ramon Castroviejo of New York, and Dr. Robert von der Heydt and Dr. Georgiana Theobald of Chicago.

SOCIETIES

The Eye Section of the Philadelphia County Medical Society held a meeting on November 5, 1936 at which the following papers were read: Retrobulbar neuritis, by Dr. R. S. Minton; Treatment of ophthalmic lues, by Dr. J. P. Quequierre; Syphilis of the central nervous system from an ophthalmological standpoint, by Dr. Robert Bookhammer; The vascular supply of the central nervous system, by Dr. Oscar V. Batson.

On December 3, 1936 the same Section gave the following program: Symposium on iridocyclitis and uveitis, by Drs. Leo F. McAndrews, Leighton F. Appleman, and Charles R. Heed.

PERSONALS

Dr. and Mrs. Casey A. Wood celebrated their fiftieth wedding anniversary on October 28, 1936, at Pasadena, California. They received many congratulatory communications. About the middle of November they flew to New York to board ship for Naples where Dr. Wood proposes to gather material for another translation from the medieval literature of ophthalmology.